

8 Documents

Publication numbers	Title	Current assignees
WO2017106910 A1	Vehicle access device mounted holder for equipment	BARJOH
EP1954529 A1	Access device	BARJOH
EP1896682 A1	Vehicle access system	BARJOH
WO2011116415 A1	Access system and device for earthmoving vehicles, and modes of employment thereof	BARJOH
CN206856631U U	Fire extinguisher holder and have its vehicle	SUZHOU JIANGNAN AEROSPACE MECHANICAL & ELECTRICAL INDUSTRY
EP2536912 A1	Access device	JUSTOY
US20170188513 A1	Agricultural or industrial vehicle ladder with powered elevating steps	AGCO
EP2481275 A1	Ladder for a work machine	DEERE

Family 1/8 - FAMPAT - ©Questel

Application number

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Title

(WO2017106910)

Vehicle access device mounted holder for equipment

Abstract

(WO2017/106910)

An equipment holder ((10),100) for mounting on an access device (14), (140) of a vehicle, such as on a side rail (16), (160)

of a retractable stair or ladder of the vehicle. The holder can be configured to hold one or more wheel chocks (12) and/or one or more fire extinguishers (121). The holder can be mounted by a unique mounting bracket (12), (120). Other equipment may be carried in the holder e.g. one or more radio communications handsets, first aid equipment, protective clothing (such as a hard hat, weatherproof jacket) or a tool kit, or combinations of two or more thereof. The holder (10), (100) can include a cradle or rack (18), (180) mounted to the access device (14), (140) by the mounting bracket (20), (120).

Current assignees

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(WO2017106910)

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(CA3009526)

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(AU2016374653)

Watermark Intellectual Property Pty Ltd ([AU])

Advantages / Previous drawbacks

(WO2017/106910)

Such an arrangement may be beneficial for applications where inversion or sideways lying retraction is not preferred.

[0020] It has been found desirable to provide a readily accessible equipment holder for use on a vehicle.

[0035] It will be appreciated that a dry powder fire extinguisher retained in the holder will move through the retracted position to the deployed position and back again each time the access device is deployed and subsequently retracted, and vice versa.

[0019] It is with such problems in mind that the present invention has been developed.

Independent claims

(WO2017/106910)

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS: 1 . A holder on a deployable and retractable access device for a vehicle, the holder providing stowage for portable equipment, the holder moving with the access device during deployment and retraction movements of the access device.

18. The main support structure may include the at least one first retainer and/or the at least one second retainer for retaining the equipment.

Object of invention

(WO2017/106910)

[0001] The present invention relates to a holder mounted on a vehicle access device.

[0050] Thus, the present invention may provide a modular system wherein the type of equipment or alternative number of the same equipment may be interchanged and retained in a main support structure mounted to the access device.

[0079] Thus, the present invention can provide a modular system wherein the type of equipment or alternative number of the same equipment may be interchanged and retained in a main support structure mounted to the access device.

Technical concepts

(WO2017106910)

EQUIPMENT(100,52)

RETAINER(100,29)

MAIN SUPPORT(100,12)

RETAINER RETENTION(91,2)

ACCESSIBLE EQUIPMENT HOLDER(87,1)

WHEEL CHOCK HOLDER(87,1)

FIRE EXTINGUISHER HOLDER(85,3)
DRY POWDER FIRE EXTINGUISHER(75,2)
STOWAGE(65,5)
COUPLED WHEEL CHOCK(56,1)
PORTABLE EQUIPMENT(54,3)
ACCESS(53,58)
HOLDER MOVEMENT(51,2)
INVERSION(49,1)
MODULAR(46,2)
DEPLOYMENT(42,4)
RETRACTION(41,2)
FASTENING(40,1)
DEPLOYED POSITION(38,3)
RETRACTED POSITION(34,7)
HOLDER ACCESS REGION(33,2)
MIND(30,2)
ACCESS DEVICE RETRACTION MOVEMENT(30,1)
CRADLE(29,7)
STORAGE CONTAINER(28,3)
MAIN SUPPORT STRUCTURE(24,11)
INVERTED RETRACTED POSITION(23,2)
LATCH(23,2)
STRAP(21,3)
RECENTLY TESTED FIRE EXTINGUISHER(20,2)
HAUL PACK(18,2)
PORTABLE FIRE EXTINGUISHER LAY(18,1)
DEPLOYED ORIENTATION(16,2)
DEPLOYABLE RETRACTABLE ACCESS STAIR(16,1)
RELEASABLE SAFETY RETAINER(16,1)
WEATHERPROOF JACKET(16,1)
COMPACTION RISK(14,1)
HOLDER STABILIZER(14,1)
PERSONNEL TRYING(14,1)
PORTABLE EXTINGUISHER(14,1)
TONNE DUMP TRUCK(14,1)
EQUIPMENT HOLDER(13,3)
INTERCHANGEABLE EQUIPMENT(13,2)
VEHICLE FIRE(13,2)
EQUIPMENT SUPPORT STRUCTURE(11,2)
COMPACTED POWDER(11,1)
DELAY RISK(11,1)
EQUIPMENT STOWAGE(11,1)
GRAVITY DEPLOYMENT(11,1)
HINGED LID(11,1)
HOLDER POCKET(11,1)
HOLDER UPWARD ORIENTATION(11,1)
INFLAMMABLE LIQUID FIRE(11,1)
INJURY RISK(11,1)
PERIODIC SOAKING(11,1)

RETAINER EQUIVALENT(11,1)
ROTATIONAL MOLDING(11,1)
ROUGH TERRAIN(11,1)
RUBBER TIRE(11,1)
SAFETY RISK(11,1)
SLIDING STAIR(11,1)
SLIPPERY WET(11,1)
VEHICLE LADDER(11,1)
EQUIPMENT REPLACEMENT(10,2)
ACCIDENTAL REMOVAL(9,1)
AID KIT(9,1)
DUSTY GROUND(9,1)
EQUIPMENT ACCIDENTAL LOSS(9,1)
EQUIPMENT SLIPPING(9,1)
FIRE EXTINGUISHER BODY(9,1)
GROUND PERSONNEL(9,1)
HEAVY EQUIPMENT(9,1)
INSERT HOLDER(9,1)
LEG KNEE INJURY LIFTING(9,1)
RADIO HANDSET(9,1)
READY AVAILABILITY(9,1)
RETRACTED ORIENTATION(9,1)
STATIC POWDER(9,1)
THERMAL WELDING(9,1)
VEHICLE OPERATOR(9,1)
VEHICLE TRAVEL(9,1)
WAIST HEIGHT(9,1)
INDUSTRIAL VEHICLE(8,3)
(US20180313151)
HOLDER(100,65)
ACCESS(100,55)
EQUIPMENT(100,54)
VEHICLE(100,43)
RETRACTABLE STAIR SIDE RAIL(100,1)
FIRE EXTINGUISHER HOLDER(56,2)
RETAINER RETENTION(53,2)
ACCESSIBLE EQUIPMENT HOLDER(50,1)
WHEEL CHOCK HOLDER(50,1)
WEATHERPROOF JACKET(46,2)
DRY POWDER FIRE EXTINGUISHER(43,2)
EQUIPMENT HOLDER(42,3)
STOWAGE(39,5)
VEHICLE LADDER(34,2)
COUPLED WHEEL CHOCK(32,1)
PORTABLE EQUIPMENT(31,3)
UNIQUE MOUNTING BRACKET(31,1)
INVERSION(28,1)
RADIO HANDSET(26,2)
CRADLE(24,8)

DEPLOYMENT(24,4)
RETRACTION(24,2)
FASTENING(23,1)
RETRACTED POSITION(22,5)
EQUIPMENT AID(22,2)
DEPLOYED POSITION(21,3)
HOLDER ACCESS REGION(19,2)
MIND(17,2)
ACCESS DEVICE RETRACTION MOVEMENT(17,1)
STORAGE CONTAINER(16,3)
MODULAR(14,2)
MAIN SUPPORT STRUCTURE(13,12)
HARD HAT(13,2)
INVERTED RETRACTED POSITION(13,2)
LATCH(13,2)
TOOLKIT(13,2)
VEHICLE ACCESS(13,1)
STRAP(12,3)
RECENTLY TESTED FIRE EXTINGUISHER(11,2)
HAUL PACK(10,2)
PORTABLE FIRE EXTINGUISHER LAY(10,1)
DEPLOYED ORIENTATION(9,2)
DEPLOYABLE RETRACTABLE ACCESS STAIR(9,1)
RELEASABLE SAFETY RETAINER(9,1)
RETAINER 125A(9,1)
COMPACTION RISK(8,1)
HOLDER STABILIZER(8,1)
PERSONNEL TRYING(8,1)
PORTABLE EXTINGUISHER(8,1)
INTERCHANGEABLE EQUIPMENT(7,2)
RETRACTED ORIENTATION(7,2)
VEHICLE FIRE(7,2)
EQUIPMENT SUPPORT STRUCTURE(6,2)
COMPACTED POWDER(6,1)
DELAY RISK(6,1)
GRAVITY DEPLOYMENT(6,1)
HINGED LID(6,1)
HOLDER POCKET(6,1)
HOLDER UPWARD ORIENTATION(6,1)
INFLAMMABLE LIQUID FIRE(6,1)
INJURY RISK(6,1)
PERIODIC SOAKING(6,1)
POWDER DRY FIRE EXTINGUISHER(6,1)
ROTATIONAL MOLDING(6,1)
ROUGH TERRAIN(6,1)
RUBBER TIRE(6,1)
SAFETY RISK(6,1)
SLIDING STAIR(6,1)
SLIPPERY WET(6,1)

EQUIPMENT REPLACEMENT(5,2)
ACCIDENTAL REMOVAL(5,1)
AID KIT(5,1)
DUSTY GROUND(5,1)
EQUIPMENT ACCIDENTAL LOSS(5,1)
EQUIPMENT SLIPPING(5,1)
FIRE EXTINGUISHER BODY(5,1)
GROUND PERSONNEL(5,1)
HEAVY EQUIPMENT(5,1)
INSERT HOLDER(5,1)
LEG KNEE INJURY LIFTING(5,1)
LIP 24B(5,1)
READY AVAILABILITY(5,1)
STATIC POWDER(5,1)
THERMAL WELDING(5,1)
VEHICLE TRAVEL(5,1)
WAIST HEIGHT(5,1)
INDUSTRIAL VEHICLE(4,3)
(JP2019500266)
HOLDER(100,78)
FIXTURE(100,46)
VEHICLE(100,31)
RETAINER(100,25)
MAIN SUPPORT STRUCTURE(100,11)
PORTABLE EQUIPMENT(100,3)
TOOL(100,3)
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EXPANDED DEVICE CONDITION(100,1)
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EXTENSION MEMBER(23,4)
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EXPANDED CONDITION(10,5)
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LADDER UNLOADING(10,1)
COMPACTION RISK(9,1)
EMERGENCY KIT(9,1)
FIRE SUPPRESSANT REAR(9,1)
HYDRAULIC SYSTEM(9,1)
MOTOR VEHICLE RECEIPT(9,1)
PORTABLE EXTINGUISHER(9,1)
POWDER CONSOLIDATION(9,1)
VEHICLE NEIGHBORHOOD(9,1)
SAFETY EQUIPMENT(8,3)
ENTRY(8,2)
EQUIPMENT REPLACEMENT(8,2)
EXTINGUISHANT(8,2)
VEHICLE FIRE(8,2)
STORAGE POSITION(7,2)
ACCESSIBLE EQUIPMENT HOLDER(7,1)
COMPACTED POWDER(7,1)
DRY POWDER FIRE EXTINGUISHER(7,1)
HEAVY FIXTURE(7,1)
HOLDER POCKET(7,1)
LID HINGE(7,1)
REMOVEABLE LATCH DETACHING(7,1)

RETAINER 24A(7,1)
RETAINER WHEEL STOP(7,1)
ROUGH TERRAIN(7,1)
SLIPPERY WET(7,1)
TON DUMP TRUCK(7,1)
VEHICLE INTENTION(7,1)
WAIST HEIGHT(7,1)
CONTAMINATION(6,2)
PROTRUSION(6,2)
VEHICLE REAR(6,2)
COMBUSTIBLE LIQUID FUEL(6,1)
EQUIPMENT ACCIDENTAL LOSS(6,1)
EXTERNAL CABINET(6,1)
FLUIDITY(6,1)
FUEL LOAD(6,1)
LOOSE DRY POWDER(6,1)
REMOVEABLE SAFETY(6,1)
ROTATIONAL MOLDING(6,1)
SAFE LOADING(6,1)
UNBURNED LIQUID(6,1)
UNIQUE MOUNTING BRACKET(6,1)
VEHICLE FAILURE(6,1)
VEHICLE MAINTENANCE(6,1)
VEHICLE OPERATOR(6,1)
VEHICLE VIBRATION(6,1)
(CA3009526)
HOLDER(100,73)
ACCESS(100,59)
EQUIPMENT(100,50)
VEHICLE(100,48)
RETAINER(100,29)
MAIN SUPPORT(100,12)
STOWAGE(100,5)
DEPLOYMENT(100,4)
PORTABLE EQUIPMENT(100,3)
HOLDER MOVEMENT(100,2)
ACCESS DEVICE RETRACTION MOVEMENT(100,1)
RETRACTABLE STAIR(99,1)
RETAINER RETENTION(91,2)
WHEEL CHOCK HOLDER(87,1)
FIRE EXTINGUISHER HOLDER(82,4)
WEATHERPROOF JACKET(80,2)
EQUIPMENT HOLDER(63,5)
VEHICLE LADDER(60,2)
COUPLED WHEEL CHOCK(56,1)
UNIQUE MOUNTING BRACKET(56,1)
RADIO HANDSET(48,2)
CRADLE(41,8)
FASTENING(40,1)

EQUIPMENT AID(38,2)
SIDERAIL(38,2)
HOLDER ACCESS REGION(33,2)
MIND(30,2)
STORAGE CONTAINER(28,3)
HARD HAT(23,2)
INVERTED RETRACTED POSITION(23,2)
LATCH(23,2)
TOOL KIT(23,2)
STRAP(21,3)
DEPLOYED POSITION(20,4)
RECENTLY TESTED FIRE EXTINGUISHER(20,2)
HAUL PACK(18,2)
PORTABLE FIRE EXTINGUISHER LAY(18,1)
MAIN SUPPORT STRUCTURE(16,9)
DEPLOYED ORIENTATION(16,2)
DEPLOYABLE RETRACTABLE ACCESS STAIR(16,1)
RELEASABLE SAFETY RETAINER(16,1)
RETAINER 125A(16,1)
DRY POWDER(15,5)
COMPACTION RISK(14,1)
HOLDER STABILIZER(14,1)
PERSONNEL TRYING(14,1)
PORTABLE EXTINGUISHER(14,1)
INTERCHANGEABLE EQUIPMENT(13,2)
RETRACTED ORIENTATION(13,2)
VEHICLE FIRE(13,2)
EQUIPMENT SUPPORT STRUCTURE(11,2)
COMPACTED POWDER(11,1)
DELAY RISK(11,1)
EQUIPMENT STOWAGE(11,1)
GRAVITY DEPLOYMENT(11,1)
HINGED LID(11,1)
HOLDER POCKET(11,1)
HOLDER UPWARD ORIENTATION(11,1)
INFLAMMABLE LIQUID FIRE(11,1)
INJURY RISK(11,1)
PERIODIC SOAKING(11,1)
POWDER DRY FIRE EXTINGUISHER(11,1)
RETAINER EQUIVALENT(11,1)
ROTATIONAL MOLDING(11,1)
ROUGH TERRAIN(11,1)
RUBBER TIRE(11,1)
SAFETY RISK(11,1)
SLIDING STAIR(11,1)
SLIPPERY WET(11,1)
EQUIPMENT REPLACEMENT(10,2)
ACCIDENTAL REMOVAL(9,1)
AID KIT(9,1)

DUSTY GROUND(9,1)
EQUIPMENT ACCIDENTAL LOSS(9,1)
EQUIPMENT SLIPPING(9,1)
FIRE EXTINGUISHER BODY(9,1)
GROUND PERSONNEL(9,1)
HEAVY EQUIPMENT(9,1)
INSERT HOLDER(9,1)
LEG KNEE INJURY LIFTING(9,1)
LIP 24B(9,1)
READY AVAILABILITY(9,1)
STATIC POWDER(9,1)
THERMAL WELDING(9,1)
VEHICLE OPERATOR(9,1)
VEHICLE TRAVEL(9,1)

Family 2/8 - FAMPAT - ©Questel

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Title

(EP1954529)

Access device

Abstract

(EP1954529)

An access system (10) for earthmoving equipment to allow a person to move from ground level to an elevated position, said access system having an access means (20) mounted to the earthmoving equipment via a pivot, and a retraction mechanism (50) therefor, said pivot allowing the access means to be retracted through a compound angle from a downwardly and outwardly deployed position to a retracted position generally adjacent and aligned beside the vehicle, the access means may be collapsible, such as with steps (30) pivotably mounted to the sides of the. access means via secondary pivots (62).

Current assignees

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Advantages / Previous drawbacks

(EP1954529)

The method may advantageously include the step of collapsing the access ladder or steps in width between deployed and retracted positions.

Thus, advantageously, the access means, which when deployed extends downwardly and outwardly from the vehicle is conveniently retracted through a compound angle to a safe position beside the vehicle, and reduces risk of the retracted access means being damaged when the vehicle is moving but, when deployed, allows the vehicle operator or other person to safely access or leave the vehicle away from vehicle parts and wheels without needing to use a vertical ladder.

The other significant advantage of the present invention is that it enables the access walkway to be reduced because the ladder does not interfere with cabin access when retracted.

If any of the control units in the hatch area break down, trouble shooting is difficult until the access system is in a deployed position.

This results in the requirement for wider walkways which possess the major problem of space management.

Independent claims

(EP1954529)

1. An access system for earth moving equipment (70) to allow a person to move from ground level to an elevated position, said access system having an access means (20) mounted to the earth moving equipment by a pivot (60), and a retraction mechanism (80) therefor, said pivot (60) having an axis which is inclined with respect to horizontal and said pivot (60) allowing the access means (20) to be retracted by the retraction mechanism (80) from a downwardly and outwardly deployed position to a retracted position, characterised in that the pivot axis is also inclined towards a direction of rotation of the access means (20) to the retracted position so that in moving from the downwardly and outwardly deployed position to the retracted position inline with and adjacent to the vehicle the access means (20) moves through a compound angle.

10. A method of retracting an access stairs or ladder for earth moving equipment (70), including the method steps of; rotating an access ladder or stairs about a pivot point (60) having an axis which is inclined with respect to horizontal from an outwardly and downwardly extending position with respect to at least part of the vehicle to a retracted position with the access ladder or stairs substantially adjacent and aligned with respect to the earth moving equipment, characterised by providing the pivot axis also at an inclination in a direction of rotation of the access ladder or stairs to the retracted position and rotating the stairs or ladder through the compound angle formed by the pivot axis from aforesaid outwardly and downwardly extending position to said retracted position.

Object of invention

(EP1954529)

The present invention provides such an access system for an earth moving vehicle as defined by the features of claim 1.

The present invention relates to access devices for earth moving equipment and in particular to a movable or retractable access device, such as a ladder or stair.

The invention provides a corresponding method of retracting an access means for earth moving equipment as specified in claim 10.

The present invention provides such an access system for an earth moving vehicle as defined by the features of claim 1.

The present invention relates to access devices for earth moving equipment and in particular to a movable or retractable access device, such as a ladder or stair.

Technical concepts

(EP1954529)

ACCESS(100,101)

ACCESS LADDER(100,8)

ACCESS STAIR(76,3)

STAIR(73,18)

STAIR COLLAPSIBILITY(69,1)

LADDER(64,31)

EARTH MOVING EQUIPMENT(60,18)

PIVOT AXIS(55,4)

RETRACTION(53,12)

RETRACTED POSITION(50,28)

COMPOUND ANGLE(47,7)
INCLINATION(43,1)
RETRACTED ACCESS(43,1)
VEHICLE OPERATOR(41,1)
VERTICAL LADDER(41,1)
DOWNWARD INCLINE(38,1)
RETRACTION ARRANGEMENT REVERSAL(38,1)
SECONDARY PIVOT(34,12)
EARTH MOVING VEHICLE(31,1)
RETRACTABLE ACCESS(29,1)
WALKWAY(27,9)
FOOT SUPPORT(26,18)
ROTATION DIRECTION(26,3)
RUNG SERIES(26,2)
OVERLAY(24,4)
DEPLOYED POSITION(23,15)
PIVOT POINT(23,1)
ELEVATOR PLATFORM(21,8)
DEPLOYMENT(20,2)
SAFE POSITION(18,1)
ELEVATED POSITION(17,2)
HATCH AREA BREAKDOWN(17,1)
RELATIVE PIVOTING(15,2)
CABIN DOOR(13,2)
PROTECTIVE DRIVER CABIN(13,2)
LADDER COLLAPSIBILITY(12,1)
LADDER OVERHANG(12,1)
PRIMARY PIVOT(11,7)
EQUIPMENT EXTREME(10,3)
EARTH MOVING EQUIPMENT MOVEMENT(9,2)
LADDER RAIL(9,1)
LENGTHY VERTICAL STILE(9,1)
PERSON ATTEMPTING(9,1)
HORIZONTAL POSITION(8,2)
MACHINE CAB(8,2)
EARTH MOVING EQUIPMENT VEHICLE(7,6)
EXCAVATOR(7,2)
ACCESS LADDER EVENT(7,1)
ELEVATOR CABIN(7,1)
LADDER INCLINATION(7,1)
TRACK OUTLINE(7,1)
VEHICLE HATCH(7,1)
WALKWAY EQUIPMENT(7,1)
GROUND LEVEL(6,9)
CHASSIS(6,2)
DANGER(6,2)
EARTH MOVING EQUIPMENT CABIN(6,2)
ENTRY DOOR(6,1)
EQUIPMENT CABINET LOCATION(6,1)

EXTRA(6,1)
HORIZONTAL RUNG(6,1)
LADDER ANGLE(6,1)
LASER CUTTING MACHINING(6,1)
LEAVER FORCE(6,1)
OUTWARDLY INCLINED DEPLOYED ACCESS(6,1)
QUARRY WALL(6,1)
RUNG MOVEMENT(6,1)
VEHICLE PART(6,1)
WALKWAY WEIGHT(6,1)
WHOLE LADDER(6,1)
HYDRAULIC RAM(5,3)
VERTICAL AXIS VARIABLE HEIGHT(5,3)
ACCESS LADDER MOVEMENT(4,1)
ACTUATING(4,1)
ALUMINUM(4,1)
BULLDOZER(4,1)
CUT MACHINING(4,1)
DEPLOYED CONDITION(4,1)
EARTH MOVING EQUIPMENT OUTLINE(4,1)
HANDRAIL(4,1)
LADDER MAJOR MEMBER(4,1)
LINK BAR(4,1)
MACHINE OPERATOR(4,1)
MOVING EARTH PRIMARY JOB(4,1)
(WO200762464)
ACCESS(100,110)
EARTH MOVING EQUIPMENT(100,22)
LADDER OVERHANG(100,3)
ACCESS LADDER(90,12)
RETRACTION(81,11)
DOWNWARD INCLINE(71,2)
LADDER COLLAPSIBILITY(60,2)
EARTH MOVING APPARATUS EXTREME(59,3)
ACCESS WALKWAY(57,1)
LADDER TREAD(57,1)
LADDER(51,28)
RETRACTED POSITION(51,27)
DEPLOYED POSITION(51,21)
CABIN ACCESS(47,1)
LADDER ANGLE(47,1)
CLOSURE MEMBER(45,2)
FOOT SUPPORT(44,18)
RELATIVE PIVOTING(44,2)
RETRACTION ARRANGEMENT REVERSAL(41,1)
PIVOT ANGLE(39,1)
SECONDARY PIVOT(36,12)
COMPOUND ANGLE(36,8)
RETRACED POSITION(33,2)

WALKWAY(29,9)
RUNG SERIES(27,2)
OVERLAY(25,5)
RETRACTABLE ACCESS(24,1)
ELEVATOR PLATFORM(23,8)
ELEVATED POSITION(23,4)
EARTH MOVING EQUIPMENT MOVEMENT(23,1)
DEPLOYMENT(22,2)
STAIR(19,10)
PIVOT POINT(18,2)
COMPLEX MULTIPLE NEED(18,1)
HATCH AREA BREAKDOWN(18,1)
AXIS MOVEMENT(16,1)
SINGLE PIVOT(15,2)
CABIN DOOR(13,2)
PROTECTIVE DRIVER CABIN(13,2)
PRIMARY PIVOT(11,7)
EARTH MOVING EQUIPMENT CABIN(11,2)
TRACK OUTLINE(11,2)
GROUND LEVEL(9,11)
EARTH MOVING EQUIPMENT PIECE(9,4)
EQUIPMENT EXTREME(9,2)
HORIZONTAL POSITION(9,2)
MACHINE CAB(9,2)
LADDER RAIL(9,1)
LENGTHY VERTICAL STILE(9,1)
PERSON ATTEMPTING(9,1)
VEHICLE ACCESS(9,1)
EARTH MOVING EQUIPMENT VEHICLE(8,6)
EXCAVATOR(8,2)
ACCESS LADDER EVENT(8,1)
ELEVATOR CABIN(8,1)
LADDER INCLINATION(8,1)
VEHICLE HATCH(8,1)
WALKWAY EQUIPMENT(8,1)
CHASSIS(6,2)
DANGER(6,2)
EARTH MOVING EQUIPMENT OUTLINE(6,2)
EARTH MOVING EQUIPMENT INCREASE(6,1)
ENTRY DOOR(6,1)
EQUIPMENT CABINET LOCATION(6,1)
HORIZONTAL RUNG(6,1)
LASER CUTTING MACHINING(6,1)
LEAVER FORCE(6,1)
OUTWARDLY INCLINED DEPLOYED ACCESS(6,1)
QUARRY WALL(6,1)
RETRACTED ACCESS(6,1)
RUNG MOVEMENT(6,1)
WALKWAY WEIGHT(6,1)

WHOLE LADDER(6,1)
HYDRAULIC RAM(5,3)
VERTICAL AXIS VARIABLE HEIGHT(5,3)
ACCESS LADDER MOVEMENT(4,1)
ACTUATING(4,1)
ALUMINUM(4,1)
BODY OUTLINE(4,1)
BULLDOZER(4,1)
CUT MACHINING(4,1)
DEPLOYED POSITION SLOWING(4,1)
EARTHMOVING EQUIPMENT MOVEMENT(4,1)
HANDRAIL(4,1)
LADDER MAJOR MEMBER(4,1)
LINK BAR(4,1)
MACHINE OPERATOR(4,1)
MOVING EARTH PRIMARY JOB(4,1)
(US20090065301)
ACCESS(100,109)
LADDER(100,39)
EARTH MOVING EQUIPMENT(100,27)
RETRACTED POSITION(100,27)
DEPLOYED POSITION(100,22)
PIVOT(100,22)
VEHICLE(100,13)
COMPOUND ANGLE(100,12)
RETRACTION(100,12)
GROUND LEVEL(100,9)
ACCESS STAIR(100,7)
PERSON(100,7)
ELEVATED POSITION(100,5)
AXIS(100,2)
STAIR COLLAPSIBILITY(74,3)
LADDER RETRACTION(49,1)
ACCESS LADDER(47,10)
LADDER OVERHANG(46,4)
RETRACTION ARRANGEMENT REVERSAL(41,3)
SECONDARY PIVOT(38,14)
STAIR(36,17)
ACCESS WALKWAY(33,1)
DOWNWARD INCLINE(30,3)
LADDER ANGLE(29,1)
FOOT SUPPORT(28,13)
CABIN ACCESS(27,1)
CLOSURE MEMBER(26,2)
RELATIVE PIVOTING(25,2)
DEPLOYMENT(24,4)
PIVOT ANGLE(23,1)
OVERLAY(18,6)
WALKWAY(16,9)

RUNG SERIES(16,2)
RETRACED POSITION(14,3)
RETRACTABLE ACCESS(11,2)
SINGLE PIVOT(11,1)
ELEVATOR PLATFORM(10,5)
PIVOT POINT(10,2)
COMPLEX MULTIPLE NEED(10,1)
HATCH AREA BREAKDOWN(10,1)
EARTH MOVING APPARATUS EXTREME(9,4)
EARTH MOVING EQUIPMENT MOVEMENT(9,3)
AXIS MOVEMENT(9,1)
HORIZONTAL POSITION(8,3)
CABIN DOOR(8,2)
PROTECTIVE DRIVER CABIN(8,2)
LADDER COLLAPSIBILITY(7,1)
PRIMARY PIVOT(6,5)
EQUIPMENT EXTREME(6,3)
LADDER RAIL(5,1)
LENGTHY VERTICAL STILE(5,1)
PERSON ATTEMPTING(5,1)
SIDE ACCESS(5,1)
VEHICLE ACCESS(5,1)
EARTH MOVING EQUIPMENT VEHICLE(4,6)
CHASSIS(4,2)
DANGER(4,2)
EARTH MOVING EQUIPMENT CABIN(4,2)
ACCESS LADDER EVENT(4,1)
ELEVATOR CABIN(4,1)
LADDER INCLINATION(4,1)
VEHICLE HATCH(4,1)
WALKWAY EQUIPMENT(4,1)
HYDRAULIC RAM(3,3)
VERTICAL AXIS VARIABLE HEIGHT(3,3)
ENTRY DOOR(3,1)
EQUIPMENT CABINET LOCATION(3,1)
EXCAVATOR(3,1)
EXTRA(3,1)
HORIZONTAL RUNG(3,1)
LASER CUTTING MACHINING(3,1)
LEAVER FORCE(3,1)
OUTWARDLY INCLINED DEPLOYED ACCESS(3,1)
QUARRY WALL(3,1)
RETRACTED ACCESS(3,1)
RUNG MOVEMENT(3,1)
WALKWAY WEIGHT(3,1)
WHOLE LADDER(3,1)
ACCESS LADDER MOVEMENT(2,1)
ACTUATING(2,1)
ALUMINUM(2,1)

BULLDOZER(2,1)
CUT MACHINING(2,1)
HANDRAIL(2,1)
LADDER MAJOR MEMBER(2,1)
(US9145091)
ACCESS(100,122)
LADDER(100,58)
EARTH MOVING EQUIPMENT(100,46)
ACCESS STAIR(100,23)
STAIR(100,20)
GROUND LEVEL(100,12)
PERSON(100,10)
ELEVATED POSITION(100,6)
EARTH MOVING VEHICLE(100,5)
RETRACTION(63,26)
LADDER RETRACTION(45,2)
RETRACTION BRINGING ARC(42,1)
PIVOT AXIS(40,11)
ACCESS LADDER(33,11)
RETRACTED POSITION(32,38)
DEPLOYED POSITION(31,31)
FURTHEST POINT(29,5)
NON PARALLEL(27,2)
FOOT SUPPORT(23,20)
LADDER ROTATION(23,1)
COMPOUND ANGLE(21,11)
CLOSURE MEMBER(21,3)
RELATIVE PIVOTING(21,3)
SECONDARY PIVOT ATTACHING(21,2)
ACCESS WALKWAY(21,1)
DOWNWARD INCLINE(19,3)
LADDER ANGLE(19,1)
CABIN ACCESS(18,1)
EARTH MOVING EQUIPMENT REAR(17,3)
ACCESS APPARATUS RETRACTION(16,1)
PIVOT ANGLE(15,1)
ACCESS MOVEMENT(13,1)
OUTWARD DEPLOYMENT POSITION(13,1)
OVERLAY(12,6)
ACCESS STAIR SIDE(12,2)
WALKWAY(11,9)
CIRCULAR ARC(11,1)
PLANE TANGENT(11,1)
RUNG SERIES(10,2)
ACCESS APPARATUS OVERHANG(10,1)
ACCESS APPARATUS RETRACTION MOVEMENT(10,1)
INCLINATION ANGLE(10,1)
EARTH MOVING EQUIPMENT PERIMETER(9,1)
ELEVATOR PLATFORM(7,5)

EARTH MOVING EQUIPMENT MOVEMENT(7,4)

LADDER OVERHANG(7,2)

RETRACTABLE ACCESS(7,2)

SINGLE PIVOT(7,1)

ACCESS STAIR LOW END(6,3)

REVERSE OPERATION MODE(6,3)

HORIZONTAL PLANE(6,2)

AXIS MOVEMENT(6,1)

COMPLEX MULTIPLE NEED(6,1)

HATCH AREA BREAKDOWN(6,1)

MOVEMENT PLANE(6,1)

PIVOT LENGTH(6,1)

VERTICAL PLANE(5,3)

CABIN DOOR(5,2)

PROTECTIVE DRIVER CABIN(5,2)

ACCESS APPARATUS MOVEMENT(5,1)

ACCESS STAIR UPPER END(5,1)

LADDER COLLAPSIBILITY(5,1)

PRIMARY PIVOT(4,5)

EQUIPMENT EXTREME(4,3)

EARTH MOVING EQUIPMENT VEHICLE(3,6)

HORIZONTAL POSITION(3,2)

ACCESS LADDER EVENT(3,1)

DEPLOYED LOW END(3,1)

ELEVATOR CABIN(3,1)

GROUND SURFACE(3,1)

LADDER INCLINATION(3,1)

LADDER RAIL(3,1)

LENGTHY VERTICAL STILE(3,1)

PERSON ATTEMPTING(3,1)

SIDE ACCESS(3,1)

VEHICLE ACCESS(3,1)

VEHICLE HATCH(3,1)

WALKWAY EQUIPMENT(3,1)

HYDRAULIC RAM(2,3)

VERTICAL AXIS VARIABLE HEIGHT(2,3)

CHASSIS(2,2)

DANGER(2,2)

EARTH MOVING EQUIPMENT CABIN(2,2)

PIVOT SIDE MEMBER(2,2)

ENTRY DOOR(2,1)

EQUIPMENT CABINET LOCATION(2,1)

EXCAVATOR(2,1)

EXTRA(2,1)

HORIZONTAL RUNG(2,1)

LASER CUTTING MACHINING(2,1)

LEAVER FORCE(2,1)

LOW ACCESS END(2,1)

OPPOSED LOW END(2,1)

OUTWARDLY INCLINED DEPLOYED ACCESS(2,1)

QUARRY WALL(2,1)

RETRACTED ACCESS(2,1)

RUNG MOVEMENT(2,1)

WALKWAY WEIGHT(2,1)

WHOLE LADDER(2,1)

ACCESS LADDER MOVEMENT(1,1)

ACTUATING(1,1)

ALUMINUM(1,1)

BULLDOZER(1,1)

CUT MACHINING(1,1)

DEPLOYMENT(1,1)

HANDRAIL(1,1)

LADDER MAJOR MEMBER(1,1)

LINK BAR(1,1)

(JP2009517265)

ACCESS(100,109)

CIVIL ENGINEERING(100,20)

ACCESS LADDER(100,14)

GROUND(100,11)

STORAGE(100,10)

FOLDING LADDER(100,4)

PERSON(100,4)

ACCESS PIVOT AXIS(100,1)

CIVIL ENGINEERING MACHINE(100,1)

RETRACTABLE LADDER(95,1)

LADDER TREAD(75,1)

CIVIL ENGINEERING MACHINE ACCESS(67,4)

VEHICLE HATCH(63,2)

COMPRESSOR STROKE(62,1)

DEPLOYED POSITION(53,24)

VEHICLE HEIGHT(52,1)

PIVOTING AXIS(51,5)

LADDER(49,32)

PIVOT AXIS(45,26)

COMPOSITE ANGLE(42,2)

LIGHTWEIGHT(42,1)

STROKE(41,7)

FOOT SUPPORT(40,10)

CROSSPIECE SERIES(40,1)

MINIMUM PAMPL(40,1)

SIDE RAIL MEMBER(38,1)

STORED DEPLOYMENT(38,1)

FOLDING(36,4)

SHOOT(36,1)

SUB STEP(36,1)

WALKWAY(34,6)

SIDEWALK(34,4)

STORED POSITION(33,18)

ACCESS DEVICE STAIR(33,1)
RETRACTION(32,2)
HATCH(31,3)
EARTH MOVING MACHINE(30,3)
PIVOTAL AXIS(29,1)
HATCHING AREA(28,2)
SPACED ELONGATED MEMBER(27,1)
PERSON APPROACHING(25,1)
APART ELONGATED MEMBER(23,1)
INVERSE STRUCTURE(23,1)
MACHINE STRUCTURE(23,1)
COMPOUND ANGLE(19,8)
STORAGE POSITION(19,6)
SUB ENHANCING LAYER(19,2)
EXTENDED POSITION(19,1)
CIVIL ENGINEERING DIRECTION(18,4)
VEHICLE PORTION(17,2)
ACTUATOR MECHANISM ACCESS(17,1)
ACCESS MEANS COLLECT(16,2)
CIVIL ENGINEERING MACHINE DIRECTION(15,1)
CIVIL ENGINEERING MACHINE END(15,1)
VERTICAL TREE(14,6)
RAISED PLATFORM(13,3)
MACHINE CABINET(13,2)
CATERPILLAR OUTLINE(13,1)
LADDER PROTRUSION(13,1)
VEHICLE SIDE(13,1)
CABIN DOOR(11,1)
LADDER RAIL(11,1)
VEHICLE COMPARTMENT DRIVER(11,1)
MACHINE PASSENGER COMPARTMENT(10,2)
COMPLEX MULTIAXIS(9,1)
INLET DOOR VICINITY(9,1)
MACHINING(9,1)
SECONDARY PIVOT(9,1)
CHASSIS(8,2)
PERSON MOVEMENT(8,2)
HYDRAULIC RAM(7,4)
MAIN PIVOT AXIS(7,4)
ACCESS MANAGEMENT(7,1)
DAMAGE RISK(7,1)
FULL DEPLOYMENT(7,1)
HEART ATTACK MAIN TASK(7,1)
HORIZONTAL SPAR(7,1)
LADDER ANGLE(7,1)
PASSENGER COMPARTMENT CHAMBER(7,1)
VEHICLE SAFETY(7,1)
WALKWAY CABIN AREA(7,1)
WALKWAY WEIGHT(7,1)

WING ANGLE(7,1)
VERTICAL AXIS VARIABLE HEIGHT(6,3)
ACCESS LADDER MOVEMENT(5,1)
ACCESS MEANS PIVOT AXIS(5,1)
ACTUATING(5,1)
BLADE VARIETY(5,1)
BREAKER(5,1)
BULLDOZER(5,1)
COLLISION(5,1)
CUTTING WIRE(5,1)
DANGER(5,1)
DRIVER CHAMBER(5,1)
EXCAVATOR TOP(5,1)
HANDRAIL(5,1)
HEADRAIL MOVEMENT(5,1)
HORIZONTAL RAIL(5,1)
INCLINED ACCESS(5,1)
LIKELIHOOD(5,1)
LINK BAR(5,1)
(JP2013032162)
ACCESS(100,108)
PIVOT AXIS(100,26)
DEPLOYED POSITION(100,24)
CIVIL ENGINEERING(100,23)
STORED POSITION(100,20)
ACCESS LADDER(100,12)
GROUND(100,11)
STORAGE(100,10)
AXIS(100,7)
PIVOTING AXIS(100,5)
PERSON(100,4)
COMPOSITE ANGLE(100,2)
VEHICLE PORTION(100,2)
ACCESS PIVOT AXIS(100,1)
CIVIL ENGINEERING MACHINE(100,1)
HANDLE(100,1)
FOLDING LADDER(77,4)
LADDER TREAD(57,1)
MOVEABLE STAIR(54,1)
CIVIL ENGINEERING MACHINE ACCESS(51,4)
VEHICLE HATCH(47,2)
COMPRESSOR STROKE(47,1)
RESIDENCE(42,1)
LADDER(41,33)
VEHICLE HEIGHT(39,1)
FOOT(36,2)
FOOT SUPPORT(34,9)
LIGHTWEIGHT(32,1)
STROKE(30,7)

CROSSPIECE SERIES(30,1)
ELONGATED MEMBER(30,1)
HATCHING AREA(29,3)
APART ELONGATED MEMBER(29,1)
RETRACTION(29,1)
SIDE RAIL MEMBER(29,1)
STORED DEPLOYMENT(29,1)
SHOOT(27,1)
SUB STEP(27,1)
SIDEWALK(26,4)
INVERSE CONFIGURATION(26,1)
WALKWAY(25,6)
FOLDING(23,5)
HATCH(23,3)
SPACED ELONGATED MEMBER(20,1)
EARTH MOVING MACHINE(17,2)
RETRACTABLE ACCESS(17,2)
MACHINE STRUCTURE(17,1)
COMPOUND ANGLE(15,8)
STORAGE POSITION(15,5)
CIVIL ENGINEERING DIRECTION(14,3)
SUB ENHANCING LAYER(14,2)
EXTENDED POSITION(14,1)
ACTUATOR MECHANISM ACCESS(13,1)
CIVIL ENGINEERING MACHINE DIRECTION(11,1)
LADDER ACCESS(11,1)
VERTICAL TREE(10,6)
ACCESS MEANS COLLECT(10,1)
LADDER PROTRUSION(10,1)
VEHICLE SIDE(10,1)
RAISED PLATFORM(8,2)
CABIN DOOR(8,1)
CABINET PLACEMENT(8,1)
LADDER RAIL(8,1)
VEHICLE COMPARTMENT DRIVER(8,1)
COMPLEX MULTIAXIS(7,1)
INLET DOOR VICINITY(7,1)
MACHINE CABINET(7,1)
MACHINING(7,1)
SECONDARY PIVOT(7,1)
PERSON MOVEMENT(6,3)
CHASSIS(6,2)
MAIN PIVOT AXIS(5,4)
HYDRAULIC RAM(5,3)
VERTICAL AXIS VARIABLE HEIGHT(5,3)
ACCESS LADDER WIDTH(5,1)
ACCESS MANAGEMENT(5,1)
DAMAGE RISK(5,1)
HEART ATTACK MAIN TASK(5,1)

HORIZONTAL SPAR(5,1)
LADDER ANGLE(5,1)
LEVERAGE FORCE(5,1)
MACHINE PASSENGER COMPARTMENT(5,1)
PASSENGER COMPARTMENT CHAMBER(5,1)
VEHICLE SAFETY(5,1)
WALKWAY CABIN AREA(5,1)
WALKWAY WEIGHT(5,1)
ACCESS LADDER MOVEMENT(4,1)
ACCESS MEANS PIVOT AXIS(4,1)
ACTUATING(4,1)
BLADE VARIETY(4,1)
BREAKER(4,1)
BULLDOZER(4,1)
COLLISION(4,1)
CUTTING WIRE(4,1)
DANGER(4,1)
DEPLOYMENT(4,1)
DRIVER CHAMBER(4,1)
EXCAVATOR TOP(4,1)
HANDRAIL(4,1)
HEADRAIL MOVEMENT(4,1)
HORIZONTAL RAIL(4,1)
INCLINED ACCESS(4,1)
(JP5828831)
ACCESS(100,127)
LADDER(100,40)
PIVOT AXIS(100,26)
CIVIL ENGINEERING(100,16)
EARTH MOVING MACHINE(100,15)
STORAGE(100,15)
STAIR(100,12)
ACCESS LADDER(100,9)
AXIS(100,9)
PIVOT(100,7)
VERTICAL(100,7)
EARTH MOVING MACHINE ACCESS(100,5)
ROTATION(100,4)
HORIZONTAL LINE(100,2)
PERSON MOVEMENT(100,1)
SLOPE(100,1)
STEPPED(100,1)
AXLE(68,5)
TROUBLE SHOOT(68,1)
AXLE ROTATION(51,1)
DEPLOYED POSITION(49,28)
ROTATION ARC(48,1)
STAIRWAY(48,1)
ELONGATED MEMBER(47,3)

CIRCULAR ARC(47,1)
STORAGE LOCATION(44,3)
FOLDING LADDER STEP(43,2)
VEHICLE HEIGHT(41,1)
INCLINE(39,1)
FOOT(37,2)
APPROACHING STEP(36,1)
STORED COMPOSITE ANGLE(35,1)
LIGHTWEIGHT(33,1)
SAFETY CONDITION(33,1)
STORAGE MECHANISM ACCESS(32,1)
FOOT SUPPORT(30,8)
STORED POSITION(29,17)
SAIDPROPULSION(29,1)
VEHICLE INTERIOR(27,3)
CONFIGURATION INVERSE(27,1)
SIDEWALK(26,6)
HATCHING AREA(25,1)
SPACED ELONGATED MEMBER(25,1)
STORAGE POSITION(23,5)
BAR SERIES(19,1)
ROTATED POSITION(19,1)
CIVIL ENGINEERING MACHINE DIRECTION(18,1)
MACHINE STRUCTURE(18,1)
CIVIL ENGINEERING MOVING DIRECTION(16,1)
FOOT SUPPORT BODY(15,2)
LADDER PROTRUSION(15,2)
TRAVEL DIRECTION(15,1)
EARTH MOVING(12,4)
MINIMUM ACCESS UNIT(12,1)
VERTICAL TREE(11,6)
STROKE FOLDING(10,2)
VEHICLE HATCH(10,2)
ELONGATED LADDER RAIL(10,1)
RETRACTABLE LADDER(10,1)
CABIN DOOR(9,1)
MACHINE CABINET(8,2)
MACHINE PASSENGER COMPARTMENT(8,2)
VEHICLE DRIVER(8,2)
STAIRCASE(7,3)
COMPLEX MULTIAXIS(7,1)
DRIVER REAR HATCH(7,1)
ENDLESS TRACK(7,1)
LADDER GROUND(7,1)
MACHINING(7,1)
MOTION ACCESS LADDER(7,1)
ROTARY SHAFT LOW END(7,1)
SIDEWALK REDUCTION(7,1)
STORED END PROJECTING(7,1)

TRACK CONTOUR(7,1)
MAIN PIVOT AXIS(6,5)
HYDRAULIC RAM(6,4)
SPAR(6,4)
CHASSIS(6,2)
SPACE MANAGEMENT(6,2)
STEPLADDER(6,2)
WALKWAY(6,2)
ACCESS MEANS DEPLOYED POSITION(6,1)
CHAMBER PASSENGER COMPARTMENT(6,1)
DAMAGE LIKELIHOOD(6,1)
DAMAGE RISK(6,1)
DEPLOYMENT LOCATION(6,1)
FOLD STROKE(6,1)
INLET VICINITY(6,1)
LADDER ANGLE(6,1)
LADDER REMOVAL MACHINE(6,1)
LOW ACCESS END(6,1)
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VEHICLE CABIN(8,1)

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INCLINE(7,2)
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ACCESS HATCH(6,1)
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EXCAVATOR(6,1)
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OPERATOR COMPARTMENT(6,1)
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OVERHANG(5,1)
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Title

(EP1896682)

Vehicle access system

Abstract

(EP1896682)

A vehicle access system and method with retractable access means (10) e.g. ladder or stairs and a retracting mechanism (25) therefor. Force applied to the access means is sufficient to retract the access means from a fully deployed position to a partially retracted position but not sufficient to not be physically resisted by a user during at least part of the retraction. With the access means in a fully retracted position, force exerted on the retracted access means can be sufficient to hold the access means in a retracted position without the need for auxiliary restraining means.

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Advantages / Previous drawbacks

(EP1896682)

Thus, advantageously, an access system for a vehicle is provided that will allow a user to overcome the retraction forces during at least part of the retraction process to thus prevent further retraction, and optionally commence redeployment of the stairs to alleviate risk of injury to the user.

It will be appreciated that a user wishing to prevent retraction of the stairs will be able to safely apply sufficient force or weight to overcome retraction forces and thus halt or reverse the retraction process.

It will be appreciated that the term access means may encompass stairs, steps and ladders for accessing vehicles.

This has the advantage that should a person be on the stairs 10 or holding the stairs 10 when they are retracted by the equipment operator the stairs 10 will not retract and injure the person holding the stairs 10.

This has the advantage that when the hand brake is released the access means are automatically retracted.

Another known problem of prior art ladder retraction systems is that, when retracted, the ladder is either held retracted by hydraulic/pneumatic pressure, such as provided by the lifting cylinder, or once retracted a locking pin is used to lock the ladder in place.

This can be a particular problem if there is a fire in the vicinity of the stair operating switch.

The stairs need to be retracted so that other personnel cannot climb up onto the machine with out the operator's knowledge.

Independent claims

(EP1896682)

1. A vehicle access system including an access means (10) and a retracting mechanism (25) for rotating the access means about a pivot axis of a main pivot (30), characterised in that the retraction mechanism (25) includes an actuator (40, 104)

and a linkage arrangement which are mounted to the access means (10) and which, in use, have a mounted geometry relative to the access means (10) and relative to the axis of the main pivot (30) such that when the actuator (40, 104) is operated the retraction mechanism (25) applies a nonlinear retraction torque to the access means (10) which is sufficient to retract the access means about the pivot axis (30) from a fully deployed position to a fully retracted position, in which respect the retraction torque applied by the retraction mechanism (25) varies so that during an initial portion of the retraction phase it is an amount that exceeds torque required to retract the access means and is able to be physically resisted by a user to prevent further retraction of the access means but during a later portion of the retraction phase it increases and, when the access means (10) is fully retracted, the retraction torque applied by the retraction mechanism (25) is sufficient to firmly hold the access means (10) in said retracted position and prevent movement of the access means (10) about the pivot axis (30) without the need for auxiliary restraining means while the vehicle is in operation.

Object of invention

(EP1896682)

This invention relates to access systems for vehicles, specifically the access system for large earth moving equipment.

This invention relates to access systems for vehicles, specifically the access system for large earth moving equipment.

With this in view, there is provided a vehicle access system including an access means and a retracting mechanism for rotating the access means as specified in claim 1.

Technical concepts

(EP1896682)

VEHICLE ACCESS(100,4)

NONLINEAR RETRACTION TORQUE(100,3)

STAIR REDEPLOYMENT(88,1)

RETRACTION(84,29)

STAIR RETRACTION(74,1)

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STAIR VICINITY(63,1)

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LIFT FORCE(3,1)
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Title

(WO2011116415)
Access system and device for earthmoving vehicles, and modes of employment thereof

Abstract

(WO2011/116415)

An access system for a vehicle (42) has an access device (40) (such as a stair or ladder), an actuation mechanism for extending and retracting the access device, the access device being extendible from a contracted configuration for deployment to permit access to the equipment and retractable to a contracted configuration for normal operation of the equipment by the actuation mechanism. The access device has a multiplicity of treads to support a user thereof during use, the treads being connected such that the access device retracts by contracting with treads closing together, and wherein the actuation mechanism includes an actuation ram (50) (hydraulic, pneumatic) and linkages (52, 64, 66), and at least one pivot (68) with at least one respective pivot axis about which the access device rotates during retraction or deployment effected by operation of the ram. Thus the access device not only retracts and extends but rotates backwards for stowage under a cab or chassis of the vehicle when retracting. A deployment assistor (90), such as a gas strut, can be used to assist gravity actuated deploy of the access device.

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Advantages / Previous drawbacks

(WO2011/116415)

Also, it is desirable that the access device is sufficiently compact when retracted so as not to impede movement of the cabin door, such as for emergency egress of the operator or ventilation/protection when necessary.

Consequently, and advantageously, the access device not only retracts to reduce its storage footprint but also rotates to store inwardly towards the chassis and towards an underside of the cab of the grader.

This is especially useful where the access device is employed on a grader by helping to avoid potential damage from the blade and/or damaging the cabin door during retraction/deployment.

Independent claims

(WO2011/116415)

15. A method of retracting a deployed access device for earth moving equipment, the access device including a multiplicity of treads for supporting a user, the method including bringing the treads closer together during a longitudinal contraction of the deployed access device and rotating the access device to a stored position.

CLAIMS: 1 . An access system for a vehicle, said system having an access device for mounting to the vehicle and an actuation mechanism for extending and retracting said access device, the access device being extendible from a contracted configuration for deployment to permit access to the equipment and retractable to a contracted configuration for normal operation of the equipment by the actuation mechanism, the access device including a multiplicity of treads to support a user thereof during use, the treads being connected such that the access device retracts by contracting with the treads closing together, and wherein the actuation mechanism includes at least one pivot including at least one respective pivot axis about which the access device rotates during retraction or deployment.

Object of invention

(WO2011/116415)

A further aspect of the present invention provides an access system for a vehicle, said system having an access device for mounting to the vehicle, and a mechanism for extending and retracting said access device, the access device being extendible from a contracted configuration for deployment to permit access to the equipment and retractable to a contracted configuration for normal operation of the equipment, the access device including a multiplicity of treads to

support a user thereof during use, the treads being connected such that the access device retracts by contracting longitudinally with the treads closing together.

Another form of the present invention provides an access system for a vehicle, including a sectional access device, each section including at least one tread unit having at least one tread for supporting a user and each section articulatory connected to at least one other said section by articulation connections such that the tread units close together during upward longitudinal retraction of the access device from a downwardly extended deployed orientation.

The present invention relates to access devices for earthmoving vehicles.

Technical concepts

(WO2011116415)

ACCESS(100,95)

VEHICLE(100,18)

ACTUATION(100,13)

DEPLOYMENT(100,9)

EARTH MOVING EQUIPMENT(100,9)

CONTRACTED CONFIGURATION(100,6)

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RETRACTABLE ACCESS(8,3)
LINK ROCKER END(8,2)
PROTECTIVE DRIVER CABIN(8,2)
UPPERMOST TREAD(8,2)
ACCESS DEVICE EXTENSION(8,1)
GRADER CHASSIS(8,1)
STORAGE POSITION(7,3)
CABIN WINDOW(7,2)
VEHICLE CABIN(7,2)
STAIR DEPLOYMENT(7,1)
STAIR RETRACTION(7,1)
UNPOWERED DEPLOYMENT(7,1)
SECTIONAL ACCESS(6,2)
SINGLE(6,2)
CABIN DOOR(6,1)
CONSECUTIVE TREAD(6,1)
DRIVER OPERATOR CABIN(6,1)
EXPANDABLE LATTICE TRELLIS ACTION(6,1)
GROUND SURFACE(6,1)
ROCKER LINKAGE(6,1)
ACTUATOR(5,5)

RETRACTED CONFIGURATION(5,5)
INTERMEDIATE TREAD(5,2)
PIVOT LINKAGE(5,2)
COMPACT CONTRACTION(5,1)
CONNECTOR LINK(5,1)
POWER EMERGENCY SHUTDOWN(5,1)
REAR WHEEL TIRE(5,1)
RETRACTION MOVEMENT REVERSAL(5,1)
SWINGING BLADE(5,1)
VIRGIN SOIL(5,1)
ACCESS DOOR(4,2)
ADAPTOR UPPER END(4,2)
ASSISTANCE(4,2)
DOUBLE(4,2)
HATCH(4,2)
INTERMEDIATE PORTION(4,2)
RETRACTION UPPER END(4,2)
WALKWAY(4,2)
CONNECTOR 12A(4,1)
DEPLOYMENT RETRACTION STAGE(4,1)
ENTRY DOOR(4,1)
EXCAVATOR(4,1)
LADDER MOVEMENT(4,1)
PIVOTING ARTICULATION MEMBER(4,1)
POWERED RAM(4,1)
RAM EXTENSION(4,1)
RETRACTED ACCESS(4,1)
RETRACTION LINK MOVEMENT(4,1)
STAGE 6D SHOW SNAPSHOT(4,1)
VEHICLE ADVANCE(4,1)
RETRACTED POSITION(3,6)
VERTICAL AXIS VARIABLE HEIGHT(3,3)
RETRACTED MODE(3,2)
ALUMINUM(3,1)
BULLDOZER(3,1)
COMPACT STORAGE(3,1)
CONCERTINA OPEN(3,1)
DEPLOYMENT MODE(3,1)
DISTURBANCE(3,1)
FIXED HANDRAIL(3,1)
FOOTPRINT(3,1)
LADDER LENGTH(3,1)
LINKAGE MOVEMENT(3,1)
NESTED CONFIGURATION(3,1)

Family 5/8 - FAMPAT - ©Questel

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(CN206856631U)

2018-01-09

Title

(CN206856631U)

Fire extinguisher holder and have its vehicle

Abstract

(CN206856631)

The utility model provides a fire extinguisher holder and have its vehicle, wherein, fire extinguisher holder includes: the support mounting board, it is installed on the stationary plane of placing the fire extinguisher, and its bottom still sets up carries out the backup pad that supports to the fire extinguisher, the strapping, its install with dismantling in on the support mounting board, and its both ends are provided with feasibly the strapping carries out the hasp that opens and shuts, be provided with a plurality of confessions on the support mounting board the mounted position that the strapping was selected and the dismantlement formula is connected. The utility model discloses a fire extinguisher holder convenient to use, good reliability, it can be adjusted according to the model of fire extinguisher to the installation of adaptable different model fire extinguishers is fixed.

Current assignees

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Representative

(CN206856631U)

YANG SHUXIA ; SUZHOU GUOCHENG PATENT AGENCY CO. LTD.

Advantages / Previous drawbacks

(CN206856631)

As compared with the prior art, the present utility model has the advantages that: fire extinguisher according to the present utility model is convenient to use the stent, better reliability, fire extinguisher is adjusted based on the model of which may be, of the extinguisher mounted to accommodate various models.

If necessary, any one row of threaded holes may be provided corresponding to one or more of the strap 30, as one embodiment, when it is desired to fix the two fire-extinguisher, a fire extinguisher holder includes five strap, wherein, two strap respectively through screw hole of the threaded holes in a row and a lower position above the screw hole of the position is fixed, the other two strap respectively above the threaded hole in the other row position for fixing the screw hole of a screw hole and a lower position, through the strap at the same time the last two rows of threaded holes are fixed screw hole of the intermediate position, and simultaneously around the fixing two extinguisher.

Independent claims

(CN206856631)

1. An extinguisher holder, characterized in, fire extinguisher holder comprising: Bracket mounting plate, which is mounted for placing on the mounting surface of the fire extinguisher, fire extinguisher is also provided on the bottom thereof for supporting the support plate; The strap, which removably mounted to the bracket mounting plate, and having both ends open and close the strap is provided with a catch; The bracket mounting plate is provided with a plurality of supply demountable connection of the strap is selected and installed position.

Object of invention

(CN206856631)

The present utility model provides a fire extinguisher holder and having their vehicles, wherein, a fire extinguisher holder

comprising: bracket mounting plate, which is mounted on the mounting surface of the extinguisher for placing, at the bottom of the extinguisher supports further provided on the support plate; strap, which is detachably mounted to the bracket mounting plate, and having both ends open and close the shackle of the strap is provided with; bracket mounting plate is provided with a plurality of supply is selected and detachably connected to the mounting position of the strap.

The present utility model is convenient to use the fire extinguisher holder, good reliability, which can be carried out in accordance with the model of the fire extinguisher is adjusted, to accommodate various sizes of the fire extinguisher is installed and fixed.

Technical concepts

(CN206856631U)

FIRE EXTINGUISHER HOLDER(100,21)

EXTINGUISHER HOLDER(100,3)

VEHICLE FIRE EXTINGUISHER HOLDER(100,1)

STRAP SHACKLE(57,1)

FIRE EXTINGUISHER(49,34)

STRAP(43,24)

THREADED HOLE(40,13)

EXTINGUISHER SUPPORT(31,1)

FIRE EXTINGUISHER MODEL(29,3)

BRACKET MOUNTING PLATE(25,13)

STRAP SUPPLY DEMOUNTABLE CONNECTION(25,1)

FIRE EXTINGUISHER SIZE(23,1)

CATCH(19,1)

SCREW HOLE(18,1)

SUPPORT PLATE(16,9)

THREADED HOLE ROW(14,3)

STENT(13,10)

FIXED FACE(11,2)

MOUNTING HOLE ARRAY(11,2)

STEPPED STRUCTURE(10,4)

ROW POSITION(10,1)

MOUNTING PLATE(9,10)

CRADLE(8,6)

INTERMEDIATE POSITION(8,1)

BRACKET MOUNTING PLATE SEPARATION(7,2)

OPEN END(7,2)

FIRE EXTINGUISHER BRACKET(5,2)

LOW POSITION(5,2)

BOTTOM EDGE(5,1)

BRACKET EXTINGUISHER(5,1)

FIRE EXTINGUISHER MOUNTING FIXTURE(5,1)

STENT WASTE(5,1)

FIXED AXIS PARALLEL(3,3)

SIDE EDGE(3,2)

LOCKING CATCH(3,1)

MOUNTING STRAP(3,1)

SPECIAL BRACKET(3,1)

STENT BASE(3,1)

THREADED APERTURE(3,1)

FIXED SURFACE(2,5)

Family 6/8 - FAMPAT - ©Questel

Application number

EP11744191

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CO12084800

CL2012002156

BR112012020916

CA2781575

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2016-11-03

(CA2781575)

2017-05-09

Title

(EP2536912)

Access device

Abstract

(EP2536912)

An access device (1), adapted to provide access between a substrate surface (2) and an elevated surface (3). The device (1) includes a mounting (4), for securement of said device (1) substantially atop said elevated surface (3), a first ladder member (5), a first end of which is pivotally attached to said mounting (4), a second ladder member (6), a first end (12) of which is pivotally attached to a second end (11) of said first ladder member (5), at an articulation joint, drive means (7), operatively connected between said mounting (4) and said first ladder member (5), to control the movement of said first ladder member (5) between an access position and a storage position, at least one guide arm (8), operatively connected between said mounting (4) and said articulation joint (18), to guide the movement of said second ladder member (6) as said drive means (7) moves said first ladder member (5). User operation of said drive means (7) controls the operation of said access device (1) between an access position and a storage position. In the access position, each of said first (5) and second (6) ladder members are substantially coaligned and extend substantially outwardly and downwardly from said elevated surface (3). In the storage position, each of said first (5) and second (6) ladder members are retracted in a substantially vertically disposed manner substantially atop said mounting (4).

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Advantages / Previous drawbacks

(EP2536912)

When providing an access device, for access between a substrate surface and an elevated surface on a vehicle, such as a mining, earth moving or railway vehicle, the access device needs to be provided such that, in its stowed position, it does not interfere with the normal operation of the vehicle, whilst, in its access position, it provides easy access between the substrate surface and the elevated surface.

In some vehicles, it is desired not to have the access device outwardly extending from the extremities of a vehicle at all, as this can interfere with the normal operation of the vehicle.

Independent claims

(EP2536912)

1. An access device (1) configured to be installed onto a vehicle, adapted to provide access between a substrate surface (2) and an elevated surface (3) of the vehicle, the access device (1) including: a mounting (4), for securement of said device (1) substantially atop said elevated surface (3); a first ladder member (5), a first end (9) of which is pivotally attached to said mounting (4) at a first pivotal connection (10); a second ladder member (6), a first end (12) of which is pivotally attached to a second end (11) of said first ladder member (5), at an articulation joint (13); drive means (7), operatively connected between said mounting (4) and said first ladder member (5), to control movement of said first ladder member (5) between an access position and a storage position; at least one guide arm (8), operatively connected between said mounting (4) and said articulation joint (13), to guide movement of said second ladder member (6) as said drive means (7) moves said first ladder member (5); whereby, said drive means (7) is configured to be operated by a user to control the operation of said access device (1) between the access position and the storage position, in which, in said access position, each of said first and second ladder members (5,6) are substantially coaligned and extend substantially outwardly and downwardly from said elevated surface (3), and, in said storage position, each of said first and second ladder members (5,6) are retracted in a substantially vertically disposed manner substantially atop said mounting (4) pivoted relative to each other from the access position; characterized in that said drive means (7) includes: a rotatable member (20) having first, second, and third pivotal connectors (21, 22, 23) spaced apart in a triangular arrangement; the first connector (21) being pivotally attached to said mounting (4); the second connector (22) being pivotally attached to said first ladder member (5) via a control arm (24) at a second pivotal connection (25); and the third connector (23) being pivotally attached to an upper extremity of said mounting (4) via an extendible arm (26); whereby, said extendible arm (26) is configured to be contracted or extended to cause said rotatable member (20) to rotate about said first connector (21), and to consequently effect movement of said access device (1) between said access and storage positions, wherein, in the access position: the third connector (23) is disposed outwardly of the first and second connectors (21, 22), the first connector (21) is disposed inwardly of the second and third connectors (22, 23), and the second connector (22) is disposed upwardly of the first and

second connectors (21, 23).

Object of invention

(EP2536912)

The present invention relates to an access device, and in particular, to an access device for providing access between a substrate surface and an elevated surface, and which is movable between an access position and a storage position.

The present invention also seeks to provide an access device which is movable between an access position and a storage position.

The present invention relates to an access device, and in particular, to an access device for providing access between a substrate surface and an elevated surface, and which is movable between an access position and a storage position.

Technical concepts

(EP2536912)

ACCESS(100,35)

ARTICULATION JOINT(100,2)

LADDER MEMBER(89,41)

VEHICLE EXTREMITY(65,2)

PIVOTAL CONNECTOR(62,1)

EXTENDABLE ARM(42,2)

EXTENDIBLE ARM(39,4)

TRIANGULAR ARRANGEMENT(38,1)

SECUREMENT(36,1)

PIVOTAL CONNECTION(32,6)

ACCESS POSITION(31,17)

ROTATABLE MEMBER(30,10)

ELEVATED SURFACE(29,16)

MINING(27,5)

STORAGE POSITION(26,12)

SUBSTRATE SURFACE(22,9)

STOWED POSITION(21,1)

RAILWAY VEHICLE(19,2)

HANDRAIL(18,5)

VEHICLE OPERATION NORMAL(17,2)

UPPER EXTREMITY(16,1)

CONTROL ARM(13,2)

GUIDE ARM(12,7)

THREE POINTED STAR(12,1)

DRIVE(9,10)

LADDER MEMBER MOVEMENT(7,3)

VERTICALLY DISPOSED(7,3)

VEHICLE PLATFORM ELEVATION(6,1)

LINK MEMBER(5,2)

SAFETY REQUIREMENT(5,1)

USER ASCENDING(5,1)

ARM ROTATION(4,1)

CONTRACTION(4,1)

(WO2011100794)

ACCESS(100,44)

LADDER MEMBER(100,42)

ELEVATED SURFACE(100,18)

SUBSTRATE SURFACE(100,10)

ARTICULATION JOINT(90,4)
VEHICLE EXTREMITY(63,1)
PIVOTAL CONNECTOR(35,2)
SECUREMENT(33,2)
EXTENDIBLE ARM(31,5)
MINING(31,5)
EXTENDABLE ARM(27,3)
ACCESS POSITION(26,20)
ROTATABLE MEMBER(26,11)
STOWED POSITION(25,1)
STORAGE POSITION(23,16)
RAILWAY VEHICLE(22,2)
TRIANGULAR ARRANGEMENT(21,2)
VEHICLE OPERATION NORMAL(20,2)
CONTRACTION(19,3)
GUIDE ARM(14,8)
THREE POINTED STAR(14,1)
ROTATABLE NIEMBER(9,1)
VERTICALLY DISPOSED(8,4)
CONTROL ARM(8,3)
LADDER MEMBER MOVEMENT(8,3)
BROAD FORM(7,1)
VEHICLE PLATFORM ELEVATION(7,1)
DRIVE(6,17)
PIVOTAL CONNECTION(6,4)
SAFETY REQUIREMENT(6,1)
USER ASCENDING(6,1)
ACKNOWLEDGEMENT(4,1)
ADMISSION(4,1)
(US20130008743)
LADDER MEMBER(100,52)
ACCESS(100,42)
ELEVATED SURFACE(100,21)
SUBSTRATE SURFACE(100,11)
ARTICULATION JOINT(91,6)
VEHICLE EXTREMITY(49,1)
SECUREMENT(34,3)
EXTENDABLE ARM(33,4)
ACCESS POSITION(28,22)
PIVOTAL CONNECTOR(27,2)
STORAGE POSITION(24,19)
MINING(24,5)
ROTATABLE MEMBER(20,12)
STOWED POSITION(19,1)
RAILWAY VEHICLE(17,2)
TRIANGULAR ARRANGEMENT(16,2)
VEHICLE OPERATION NORMAL(15,2)
GUIDE ARM(14,9)
CONTRACTION(14,3)

EXTENDIBLE ARM(11,4)
THREE POINTED STAR(11,1)
VERTICALLY DISPOSED(8,5)
DRIVE(7,18)
CONTROL ARM(6,3)
BROAD FORM(6,1)
VEHICLE PLATFORM ELEVATION(6,1)
LADDER MEMBER MOVEMENT(5,2)
PIVOTAL CONNECTION(4,4)
SAFETY REQUIREMENT(4,1)
USER ASCENDING(4,1)
ACKNOWLEDGEMENT(3,1)
ADMISSION(3,1)
(US9447638)
ACCESS(100,50)
ELEVATED SURFACE(100,22)
SUBSTRATE SURFACE(100,12)
VEHICLE(100,6)
LADDER STILE(100,4)
VEHICLE SURFACE ELEVATION(100,3)
LADDER RUNG(95,4)
LADDER MEMBER(80,59)
EXTENDIBLE ARM END(76,4)
EXTENDIBLE ARM(72,13)
ARTICULATION JOINT(65,7)
EXTREMITY(56,11)
PIVOTAL CONNECTOR(44,4)
ROTATABLE MEMBER(33,18)
PLANAR MOUNTING PLATE(32,10)
TRIANGULAR ROTATABLE MEMBER(30,2)
DRIVE(28,20)
VEHICLE EXTREMITY(27,1)
TRIANGULAR ARRANGEMENT(26,4)
MAJOR LENGTH(20,4)
GUIDE ARM(19,17)
LIP(19,2)
MOUNTING EXTREMITY(19,1)
STORAGE POSITION(18,20)
ACCESS POSITION(14,20)
MAJOR LONGITUDINAL LENGTH(14,2)
PIVOT POINT(13,7)
MINING(13,5)
RAILWAY VEHICLE(12,3)
CONTROL ARM(11,5)
STOWED POSITION(11,1)
VERTICAL(9,2)
EXTREMITY BOTTOM END(8,2)
VEHICLE OPERATION NORMAL(8,2)
EXTREMITY TOP END(7,2)

CURVED HANDRAIL END(7,1)
LADDER MEMBER END(4,1)
ACCESS DEVICE MOVEMENT(3,2)
EXTENDABLE ARM(3,2)
BROAD FORM(3,1)
VEHICLE PLATFORM ELEVATION(3,1)
PIVOTAL CONNECTION(2,4)
CONTRACTION(2,2)
LADDER MEMBER MOVEMENT(2,2)
ACKNOWLEDGEMENT(2,1)
GUIDE ARM END(2,1)
SAFETY REQUIREMENT(2,1)
USER ASCENDING(2,1)
(JP2013519577)
LADDER MEMBER(100,34)
ACCESS(100,31)
ACCESS POSITION(100,22)
MOUNTING PORTION(100,17)
STORAGE(100,14)
SURFACE ELEVATION(100,7)
UPPER(100,7)
ELEVATION(100,6)
ARTICULATION(100,4)
CONTROL(100,3)
ARTICULATION POINT MOUNTING PORTION(100,1)
DRIVE MEANS OPERATION(100,1)
LADDER END PORTION(100,1)
MOUNTING PORTION END(100,1)
MOUNTING PORTION PLANE(100,1)
LADDER(39,34)
EXTENSION CONTRACTION(29,1)
PIVOTAL CONNECTOR(28,1)
MINE VEHICLE(22,4)
ROTATABLE MEMBER(18,11)
MOTION DIRECTION(18,1)
ILZ(15,1)
HANDRAIL(14,4)
RAILCAR(13,4)
STAR POINT(12,1)
GUIDE ARM(10,8)
EXTENSIBLE ARM DISTAL END(10,1)
STORAGE POSITION(9,8)
EARTH MOVING VEHICLE(9,6)
ELEVATED SURFACE(6,4)
CONTROL ARM(6,2)
PIVOTING CONNECTOR(5,1)
CONTRACTION(4,2)
PISTON(4,2)
EXTENDABLE ARM(4,1)

FORCE EXTENSIBLE ARM(4,1)
HEALTH REQUIREMENT(4,1)
TRIANGLE SEQUENCE(4,1)
UPPER SURFACE(4,1)
DRIVE(3,13)
RAILWAY VEHICLE(3,2)
ACCOMMODATION(3,1)
(JP5849055)
ACCESS(100,51)
LADDER MEMBER(100,33)
MOUNTING PORTION(100,23)
ROTATABLE MEMBER(100,18)
DRIVING(100,9)
UPPER(100,9)
SURFACE ELEVATION(100,8)
EXTENDABLE ARM(100,4)
ELEVATION SURFACE(100,3)
PIVOTABLE CONNECTOR(100,3)
TRIANGLE SEQUENCE(100,3)
EXTENDABLE ARM END(85,2)
LADDER(67,26)
MEMBER LADDER(48,3)
HANDRAIL(29,5)
ARTICULATION(26,3)
ACCESS POSITION(25,21)
STORAGE POSITION(24,15)
GUIDE ARM(24,14)
MINE VEHICLE(24,2)
EXTENDABLE ARM DISTAL END(20,1)
GUIDE MEMBER(19,2)
CONNECTOR TIP PORTION(18,1)
RAILROAD CAR(17,1)
DISTAL EXTENSION END(15,1)
LADDER MEMBER MOUNTING PORTION(14,2)
CONTROL ARM(14,1)
FULCRUM POINT(13,1)
STAR POINT(10,2)
GUIDE MEMBER OPERATION(10,1)
ROTATABLE MEMBER END(10,1)
EARTH MOVING VEHICLE(9,5)
DRIVE(6,9)
PIVOT POINT(6,7)
MOUNTING PART(5,3)
WORKER HEALTH(5,1)
ARM MEMBER(4,4)
CONTRACTION(4,2)
PISTON(4,2)
RAILCAR(4,2)
FORCE EXTENSIBLE ARM(4,1)

GUIDE ARM END(4,1)
LADDER ELEVATION MEMBER(4,1)
MINING VEHICLE(4,1)
VEHICLE ELEVATION(4,1)
APPROVAL(3,1)
AUTHORIZATION(3,1)
CONTOUR(3,1)
ELEVATOR(3,1)
ELONGATION(3,1)
END CURVED SHAPE(3,1)
FALLING ANGLE(3,1)
MINE(3,1)
MOUNTING PORTION END(3,1)
RECEPTACLE(3,1)
(CA2781575)
LADDER MEMBER(100,64)
ACCESS(100,50)
ELEVATED SURFACE(100,24)
ACCESS POSITION(100,22)
STORAGE POSITION(100,22)
CONNECTOR(100,15)
SUBSTRATE SURFACE(100,12)
EXTENDIBLE ARM(100,11)
EXTREMITY(100,11)
VEHICLE(100,6)
CONTROL ARM(100,4)
EXTENDIBLE ARM END(100,4)
LADDER STILE(100,4)
VEHICLE SURFACE ELEVATION(100,3)
EXTREMITY BOTTOM END(100,2)
LADDER RUNG(95,4)
ARTICULATION JOINT(84,9)
PIVOTAL CONNECTOR(38,3)
PLANAR MOUNTING PLATE(34,10)
TRIANGULAR ROTATABLE MEMBER(31,2)
ROTATABLE MEMBER(29,16)
VEHICLE EXTREMITY(27,1)
DRIVE(25,21)
TRIANGULAR ARRANGEMENT(23,3)
GUIDE ARM(21,17)
MAJOR LENGTH(20,4)
LIP(19,2)
SECUREMENT(16,2)
MAJOR LONGITUDINAL LENGTH(15,2)
PIVOT POINT(13,7)
MINING(13,5)
RAILWAY VEHICLE(12,3)
STOWED POSITION(11,1)
VERTICAL(9,2)

VEHICLE OPERATION NORMAL(8,2)
EXTREMITY TOP END(7,2)
CURVED HANDRAIL END(7,1)
VERTICALLY DISPOSED(4,4)
LADDER MEMBER MOVEMENT(3,3)
EXTENDABLE ARM(3,2)
VEHICLE PLATFORM ELEVATION(3,1)
PIVOTAL CONNECTION(2,4)
CONTRACTION(2,2)
BROAD FORM(2,1)
GUIDE ARM END(2,1)
SAFETY REQUIREMENT(2,1)

Family 7/8 - FAMPAT - ©Questel

Application number

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Title

(US20170188513)

Agricultural or industrial vehicle ladder with powered elevating steps

Abstract

(US20170188513)

A powered ladder is operable to move a person vertically relative to an agricultural or industrial vehicle. The ladder broadly includes an elongated ladder frame, a step, and a step drive. The ladder frame includes a pair of ladder rails that cooperatively define an upright ladder axis and a path therebetween, with the path extending along the ladder axis. The step is shiftably attached to the ladder frame and is positioned at least partly within the path. The step drive is drivingly connected relative to the step to drive the step between upper and lower positions.

Current assignees

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Advantages / Previous drawbacks

(US20170188513)

However, it will be appreciated that the ladder 20 could be alternatively used.

For instance, ladders and steps of conventional vehicles are difficult for a person to climb and can be potentially dangerous to climb.

Embodiments of the present invention provide a powered ladder for an agricultural or industrial vehicle that does not suffer from the problems and limitations of the prior art ladders and steps set forth above.

The difficulty of climbing conventional ladders and steps is particularly evident if the person has limited physical range of motion (e.g., due to inflexibility or injury), is overweight, has poor cardiovascular fitness, and/or has poor muscular fitness.

Independent claims

(US20170188513)

1. A powered ladder for an agricultural or industrial vehicle, wherein the ladder is operable to move a person vertically relative to the agricultural or industrial vehicle, said powered ladder comprising: an elongated ladder frame including a pair of ladder rails that cooperatively define an upright ladder axis and a path therebetween, with the path extending along the ladder axis; a step shiftably attached to the ladder frame and positioned at least partly within the path, with the step being shiftable along the path between upper and lower positions; and a step drive drivingly connected relative to the step to drive the step between the upper and lower positions.

Object of invention

(US20170188513)

The present invention relates generally to agricultural and industrial equipment.

A first aspect of the present invention concerns a powered ladder for an agricultural or industrial vehicle, wherein the ladder is operable to move a person vertically relative to the agricultural or industrial vehicle.

Technical concepts

(US20170188513)

POWERED LADDER(100,27)

INDUSTRIAL VEHICLE(100,12)

ELEVATING STEP(100,1)

INDUSTRIAL VEHICLE LADDER(100,1)

LADDER RAIL(47,35)

LADDER AXIS(41,23)

CARDIOVASCULAR FITNESS(38,1)

MUSCULAR FITNESS(37,1)

LADDER FRAME(33,8)

ELONGATED LADDER FRAME(27,3)

LADDER(26,33)

UPRIGHT LADDER AXIS(23,4)

INFLEXIBILITY(17,1)

DRIVE STEP(12,6)

SIMULTANEOUS SLIDING MOVEMENT(12,3)

STEP SLIDE(11,3)

INJURY(11,1)

ROLLER BEARING(10,3)

PHYSICAL MOTION RANGE(7,1)

PLATFORM(6,13)

STEP SLIDING MOVEMENT(6,3)

SELECTIVE CAB INGRESS(6,2)

LOW POSITION(5,7)

BCS RODLESS SCREW(5,1)

SELF PROPELLED AGRICULTURAL HARVESTER(4,1)

LOWERMOST POSITION(3,9)

UPPER FASTENER(3,7)

UPPERMOST POSITION(3,6)

BRACE(3,4)

HAND RAILING(3,4)

CARRIER MARGIN(3,2)

ENCLOSED OPERATOR CAB(3,1)

ENDLESS BEARING BRIM(3,1)

EQUIVALENT DOCTRINE(3,1)

POWERED CHASSIS(3,1)

SELF PROPELLED AGRICULTURAL VEHICLE(3,1)

VEHICLE LADDER(3,1)
VEHICLE OPERATOR CAB(3,1)
LOW FASTENER(2,3)
UPWARD DIRECTION(2,3)
ACTUATOR AXIS(2,2)
GUSSET(2,2)
RIGID SHEET(2,2)
HYDRAULICALLY POWERED LINEAR ACTUATOR(2,1)
LADDER CONFIGURATION(2,1)
PRESS BRAKE(2,1)
BENDING(1,1)
FEMALE FEATURE(1,1)

Family 8/8 - FAMPAT - ©Questel

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(EP2481275)

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Title

(EP2481275)

Ladder for a work machine

Abstract

(EP2481275)

The working machine comprises a load-bearing structure movable in a forward direction, and a cabin fastened at the supporting structure, which has an operator workstation. A climbing unit (38) is provided, which is moved opposite to the machine-fixed platform (42) between an operating position and an inoperative position. The climbing unit is supported on the bearing structure rotating around a vertical axis of rotation (40).

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(EP2481275)

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(DE102011003354)

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Advantages / Previous drawbacks

(EP2481275)

In many types of work machines is the operator's station at a greater height above the ground, to prevent the operator to provide a good overview of the surface to be treated.

The present arrangement makes it possible, the cab 32 and the door 34 to be dimensioned large in such a way, that the door in the open position laterally across the platform 42 and therefore across the allowable width for road travel projects. Thus it is possible to save expensive means for transmitting force to a spaced-apart from the mechanism axis of rotation.

Also this arrangement is not suitable for the cabin, the width in such a way, that their door in the open position projects laterally over the driver's platform, this is because such a door would be inline with side railings of the trips up to collide.

Independent claims

(EP2481275)

1. Work (10) machine with a shaft in a forward direction (V) movable, load- (12) bearing structure, one on the loadbearing structure (12) attached to the cab (32), the operator's station and an at least approximately a vertical door pivot (36) axis outwardly pivotable door (34) includes, a walk-in, of the (34) door laterally adjacent, fixed to the machine platform (42), and a with respect to the fixed to the machine between an operating position and a walk-in nonoperating position the platform (42) can be moved in steps (48) with superposed ascent (38), characterized in, that an at least approximately vertical axis of rotation (40) in a rotatable manner on the ascent (38) of the load (12) bearing structure is supported, and that the axis of rotation (40) and the door pivot (36) axis at or near diagonally opposite corners of the platform (42) are positioned fixed to the machine.

Object of invention

(EP2481275)

The invention relates to a work machine having a movable loadbearing structure in a forward direction, a capsule affixed to the supporting structure, an operator workstation and the about an approximately vertical pivot axis to the outside of the door a pivotable door, a walk-in, of the door adjacent, fixed to the machine platform, and a platform between an operative position with respect to the fixed to the machine and a walk-in nonoperating position with movable ascent steps arranged one above the other.

The invention relates to a work (10) machine having a forward direction (V) movable, support structure (12), one to the supporting structure (12) attached car (32), an operator's station and an at least approximately vertical door pivot (36) axis outwardly pivotable door (34), an accessible, the door (34) laterally adjacent, engine fixed platform (42), and from the machine fixed platform (42) between an operating trips (38) moving the inoperative position accessible a with superposed steps (48).

Technical concepts

(EP2481275)

AGRICULTURAL WORK(100,1)

LADDER(100,1)

SUPERPOSED ASCENT(100,1)

AXIS OUTWARDLY PIVOTABLE DOOR(82,2)

MACHINE PLATFORM(81,8)

OPERATOR STATION(80,6)

PIVOTABLE DOOR(65,1)

DOOR(59,25)

WALKING(54,8)

VERTICAL DOOR PIVOT(54,2)

ASCENT(52,40)

PLATFORM DIAGONALLY OPPOSITE CORNER(51,2)

ENGINE FIXED PLATFORM(49,1)

STAIR TREAD PIVOT AXIS(47,1)

MOVEABLE ASCENT(44,2)

OPERATOR WORKSTATION(42,5)

DRIVER PLATFORM(41,6)
PLATFORM(40,16)
SUPERPOSING STEP(40,1)
RAILING MEMBER(38,3)
DOOR PIVOT(37,2)
MACHINE FIXED PLATFORM(36,4)
ROTATABLE CRANK(34,2)
CAPSULE(34,1)
SUPPORT STRUCTURE(32,11)
INOPERATIVE POSITION(32,3)
ASCENT MOVEMENT(32,1)
MOVEABLE LOAD BEARING STRUCTURE(32,1)
FORWARD DIRECTION(31,9)
LOAD BEARING STRUCTURE(31,2)
CABIN(30,10)
TRIP(30,8)
VERTICAL PIVOT AXIS(29,1)
FORCE TRANSMISSION(25,2)
NON OPERATING POSITION(24,13)
MOVEABLE PLATFORM NON OPERATING POSITION(24,1)
CAB(22,7)
BEARING STRUCTURE(22,1)
WORK MACHINE(21,5)
SURFACE OVERVIEW(21,1)
FORWARD DIRECTION TRIP(19,1)
FORWARD LIMIT(19,1)
OPERATIVE POSITION(18,5)
REARWARD(18,2)
ROTATION VERTICAL(18,2)
SIDE RAILING(18,1)
TRIP POSITION(18,1)
PLATFORM POSITION(16,1)
HORIZONTAL AXIS(14,3)
TRAVEL DIRECTION(13,4)
MACHINE RESISTANT PLATFORM(13,2)
INCLINED CONVEYER(11,2)
ASCENT MOVEABLE PLATFORM(11,1)
ASCENT SAVING ADJUSTMENT(11,1)
LIMITED EXTENT(11,1)
ROAD ASCENT TRAVEL(11,1)
STRUT ASCENT(11,1)
TRIP SLIDABLE ATTACHMENT(11,1)
PARALLEL AXIS(9,3)
EXPENSIVE(9,2)
AGRICULTURAL COMBINE HARVESTER(9,1)
ASCENT DISPLACEMENT(9,1)
CRANK ACTUATION(9,1)
HARVESTING ALLOWABLE WIDTH(9,1)
HINGED STRUT(9,1)

HINGED TRIP(9,1)
PALLET PLATFORM(9,1)
PLATFORM DESCENT(9,1)
SWEEP TRIP(9,1)
UNLOADING CONVEYER(9,1)
CRANKSHAFT(8,2)
ASCENT PIVOTAL MOVEMENT(8,1)
CABIN INTERIOR(8,1)
CAR DOOR(8,1)
DISTURBANCE EVENT(8,1)
DUAL TIRE MOUNTING(8,1)
MOWING VEHICLE(8,1)
PLATFORM VICINITY(8,1)
STEERABLE WHEEL(8,1)
DOOR PIVOT AXIS(7,5)
ROTARY BEARING OUTER SLEEVE(6,2)
SOLID PLATFORM(6,2)
ASCENT ARRANGEMENT(6,1)
ASCENT INTEGRAL PROJECTING ELEMENT(6,1)
ASCENT NON OPERATING POSITION(6,1)
CABIN FRAME(6,1)
CRANK COUPLING(6,1)
CRANK ROTATION(6,1)
DIAGONALLY OPPOSITE CORNER VICINITY(6,1)
FORAGE HARVESTER(6,1)
FORCE EXPENDITURE(6,1)
GRAIN TANK(6,1)
HARVESTING MACHINE FRAME(6,1)
LATERAL BOUNDARY(6,1)
LATERALLY OUTER END(6,1)
MECHANISM END(6,1)
RESIDUAL GRAIN(6,1)
SCHEMATIC SIDEVIEW(6,1)
SELF PROPELLED HARVESTER(6,1)
SIDE FIXED PLATFORM(6,1)
TRANSPORT VEHICLE(6,1)
TRIP COLLISION FREE PIVOTING(6,1)
UPPER STAIR TREAD(6,1)
RULE(5,3)
DOOR OPENING(5,2)
ASCENSION DIRECTION(4,1)
ASCENT PASS(4,1)
CIRCULAR ARC(4,1)
(EP2481275)
WORK MACHINE(100,15)
LADDER(100,9)
OPERATOR WORKPLACE(81,1)
PLATFORM(74,24)
OUTWARDLY PIVOTING DOOR(69,1)

RAILING ELEMENT(58,5)
DOOR(55,24)
OPERATOR WORKSTATION(46,3)
DIAGONALLY OPPOSITE CORNER VICINITY(45,2)
MOVEABLE ASCENT(43,2)
DRIVER PLATFORM(41,7)
CABIN(34,11)
INOPERATIVE POSITION(34,4)
MACHINE PLATFORM(34,4)
CRANK MOVEMENT ROTATIONAL(34,1)
DOOR PIVOT AXIS(32,9)
SUPPORT STRUCTURE(32,9)
MOVEABLE LOAD BEARING STRUCTURE(32,1)
WALKING(30,6)
LADDER INOPERATIVE POSITION(29,1)
CAB(28,7)
OPERATIVE POSITION(28,4)
FORWARD DIRECTION(27,9)
MOVEABLE PLATFORM(26,4)
FORCE TRANSMISSION(25,2)
LOAD BEARING STRUCTURE(22,3)
VERTICAL PIVOT AXIS(22,2)
NON OPERATING POSITION(18,11)
LADDER POSITION(17,1)
SIDE RAILING(17,1)
ROTATION VERTICAL(16,1)
OPERATOR STATION(14,5)
HORIZONTAL AXIS(14,3)
STEPPING DOWN(14,1)
TRAVEL DIRECTION(12,4)
OPEN POSITION(12,3)
STRUT ASCENT(12,1)
INCLINED CONVEYER(11,2)
ASCENT SAVING ADJUSTMENT(11,1)
EXPENDITURE(9,2)
EXPENSIVE(9,2)
PARALLEL VERTICAL(9,2)
AGRICULTURAL COMBINE HARVESTER(9,1)
ASCENT DISPLACEMENT(9,1)
CRANK ACTUATION(9,1)
HINGED STRUT(9,1)
MACHINE RESISTANT PLATFORM(9,1)
PIVOTABLE TRIP(9,1)
SWEEP TRIP(9,1)
UNLOADING CONVEYER(9,1)
WORK ROAD TRIP(9,1)
ASCENT PIVOTING MOVEMENT(8,1)
ASCENT SOLID PLATFORM(8,1)
CABIN INTERIOR(8,1)

DISTURBANCE EVENT(8,1)
DUAL TIRE MOUNTING(8,1)
HARVESTING FRAME(8,1)
HARVESTING MACHINE ALLOWABLE WIDTH(8,1)
MOWING VEHICLE(8,1)
PLATFORM Laterally Outer End(8,1)
PLATFORM VICINITY(8,1)
ROTATABLE CRANK(8,1)
STEERABLE WHEEL(8,1)
ROTARY BEARING OUTER SLEEVE(6,2)
SPAR(6,2)
ASCENT ARRANGEMENT(6,1)
ASCENT NON OPERATING POSITION(6,1)
CAR DOOR OPENING(6,1)
CRANK COUPLING(6,1)
CRANK ROTATION(6,1)
CRANKSHAFT(6,1)
FORAGE HARVESTER(6,1)
GRAIN TANK(6,1)
HYDROSTATIC MOTOR(6,1)
LATERAL BOUNDARY(6,1)
PLATFORM DIAGONALLY OPPOSITE CORNER(6,1)
SCHEMATIC SIDEVIEW(6,1)
SELF PROPELLED HARVESTER(6,1)
SLIDABLE ATTACHMENT(6,1)
SOLID PLATFORM TRIP(6,1)
TRANSPORT VEHICLE(6,1)
TRIP DRIVE(6,1)
RULE(5,3)
ARM ROTATION(4,1)
ASCENSION DIRECTION(4,1)
BOTTLE(4,1)
CIRCULAR ARC(4,1)
DOOR CLOSING(4,1)
DRIVE ACTUATOR(4,1)
DRIVING WHEEL(4,1)
(DE102011003354)
ASCENT(100,38)
MACHINE PLATFORM(100,13)
WORK MACHINE(100,4)
OPERATOR WORKSTATION(95,10)
SUPERIMPOSED TREAD(93,3)
OUTWARDLY PIVOTING DOOR(76,1)
DIAGONAL CORNER(69,1)
CAPSULE(61,3)
MOVEABLE TREAD(60,1)
DOOR(48,30)
EXTERNAL DOOR(44,1)
ENGINE PLATFORM(42,1)

FIXED PLATFORM(41,4)
HINGED DOOR(41,2)
DOOR VERTICAL(41,1)
PIVOTABLY MOUNTED STRUT(40,3)
SUPPORT STRUCTURE(39,14)
WALKING(39,2)
ACCESSIBLE ASCENT(38,1)
ALLOWABLE WIDTH(38,1)
PRACTICABLE MOVEABLE(36,1)
LOAD BEARING STRUCTURE(35,1)
ROTATABLE CRANK(35,1)
FIXED PLATFORM RELATION(33,1)
MACHINE SOLID PLATFORM(31,3)
CABIN ASCENT(30,2)
MOVEABLE LOAD BEARING STRUCTURE(29,1)
FORWARD DIRECTION(28,8)
INOPERATIVE POSITION(27,12)
DOOR PIVOT AXIS(25,4)
MOVEABLE PLATFORM(24,4)
CRANK ROTATION(24,3)
MACHINE INOPERATIVE POSITION(23,1)
SOLID DIAGONALLY OPPOSITE CORNER(22,1)
ROTATION VERTICAL(21,2)
MACHINE FIXED PLATFORM(20,1)
BOOTH(19,2)
DRIVER CAB(18,6)
COUPLING ARM(17,1)
WORK SURFACE OVERVIEW(17,1)
INACTIVE POSITION(16,6)
RAIL MEMBER(15,3)
MOUNTING SHAFT(13,1)
VERTICAL(12,8)
HORIZONTAL AXIS(12,4)
ROTATION AXIS(11,5)
RESIDUAL GRAIN THRESHING(11,1)
DIAGONAL CORNER VICINITY(10,1)
UNLOADING AUGER(10,1)
REDUCTION GEAR(8,4)
AGRICULTURAL COMBINE HARVESTER(8,1)
CRANK ACTUATION(8,1)
OPEN STATE MACHINE(8,1)
ACCESSIBLE PLATFORM(7,1)
BOX DESCENT(7,1)
CABIN INTERIOR(7,1)
DRIVER PLATFORM(7,1)
FEEDER HOUSE(7,1)
HARVESTING MACHINE ALLOWABLE WIDTH(7,1)
MACHINE OPERATOR WORKSTATION(7,1)
MOBILE SCHEMATIC SIDEVIEW(7,1)

MOWING VEHICLE(7,1)
RAILING SHAFT(7,1)
STEERABLE WHEEL(7,1)
SUPERPOSED STAGE(7,1)
OPEN POSITION(5,4)
ASCENT DEVICE DELAMINATION(5,1)
ASCENT DEVICE TREAD(5,1)
CAR DOOR OPENING(5,1)
CRANK ARM(5,1)
ELEVATOR SUPPLY(5,1)
EXPENDITURE(5,1)
GRAIN TANK(5,1)
LATERAL BOUNDARY(5,1)
LONGITUDINAL MACHINE CENTERLINE(5,1)
MACHINE MOTOR VEHICLE(5,1)
NON OPERATING POSITION TREAD(5,1)
PARALLEL END(5,1)
PLATFORM RELEASE(5,1)
RATHER COMPLICATED MECHANIC(5,1)
SHAFT FREELY ROTATABLE ROTARY(5,1)
STAIR AXIS(5,1)
TRANSPORT VEHICLE(5,1)
ASCENSION(4,1)
CATWALK(4,1)
CHASSIS BOTTOM(4,1)
CHOPPING(4,1)
COSTLY ROTATION(4,1)
CRANKSHAFT(4,1)
CROP HARVESTING OPERATION(4,1)
DOOR CLOSING(4,1)