

Search query (1): [SP]: A load stability system apparatus for stabilizing a load suspended via a cable from above, the apparatus comprising: a center module comprising: an attachment point for the cable; an attachment point for the load; a tensile structural element between the attachment point for the cable and the attachment point for the load; and a thruster mounting structure connected to the tensile structural element; a power supply; a sensor array comprising: an inertial measurement system; an orientation measurement system; and an absolute position measurement system; a wireless transceiver; a thruster controller; two or more thrusters connected to the thruster mounting structure and controlled by the thruster controller; and a processor operably connected to the sensor array, the wireless transceiver, and the thruster controller; wherein the processor is configured to: determine a motion of the load, based on the sensor array measurement systems; and apply thrust to counteract the motion of the load, by controlling the thrusters. Claim 2. The load stability system apparatus of Claim 1, wherein the two or more thrusters comprise unidirectional or bidirectional ducted fans. Claim 3. The load stability system apparatus of Claim 1, wherein the two or more thrusters comprise an even number of thrusters, and pairs of thrusters are mounted on opposite sides of the center module. Claim 4. The load stability system apparatus of Claim 3, wherein the two or more thrusters are mounted in a fixed orientation relative to the center module, the apparatus is capable of being reoriented by the pairs of thrusters mounted on opposite sides of the center module, and the processor is further configured to orient the apparatus to a direction to apply thrust to counteract the motion of the load. Claim 5. The load stability system apparatus of Claim 1, further comprising a thruster mount mechanism wherein the two or more thrusters are toollessly detachable from the center module. Claim 6. The load stability system apparatus of Claim 1, wherein the attachment point for the cable comprises one or more of a hoist ring or a hook and is configured to allow rotation around the axis of the cable such that a twist or rotational motion of the cable is decoupled from the orientation of the apparatus. Claim 7. The load stability system apparatus of Claim 1, wherein the power supply comprises one or more batteries. Claim 8. The load stability system apparatus of Claim 7, further comprising a charging station configured to electrically connect to the apparatus to charge the one or more batteries and to physically receive and secure the apparatus. Claim 9. The load stability system apparatus of Claim 1, wherein the power supply comprises a wired power connection. Claim 10. The load stability system apparatus of Claim 1, further comprising a housing around the center module. Claim 11. The load stability system apparatus of Claim 1, wherein the sensor array inertial measurement system comprises at least one accelerometer or gyroscope, the sensor array orientation measurement system comprises at least one magnetometer or compass, and the sensor array absolute position measurement system comprises a Global Positioning System (GPS) sensor. Claim 12. The load stability system apparatus of Claim 1, wherein the sensor array further comprises at least one of a proximity sensor or light detection and ranging (LIDAR) system, an infrared (IR) or optical sensor, a gravitational sensor, a strain sensor, a rotational encoder or thruster speed sensor, or a shutdown pin presence sensor. Claim 13. The load stability system apparatus of Claim 1, further comprising a remote positional unit external to the apparatus, located at a position that is fixed relative to the location from which the cable is suspended or a target location, wherein the remote positional unit includes a positional transceiver configured to communicate with the wireless transceiver and provide a positional reference to the apparatus. Claim 14. The load stability system apparatus of Claim 1, further comprising external status indicator lights configured to indicate one or more of a position of the apparatus, an orientation of the apparatus, a distance from obstacles, a height above ground, a signal quality of the wireless transceiver, a mode or command state of the processor, an inertial behavior of the load, an energy capacity or available power of the power supply, a work load or power consumption of the two or more thrusters, the thrust from each thruster, a motion or direction of thrust of the apparatus, and a recommended direction for an operator to maneuver a platform suspending the load. Claim 15. The load stability system apparatus of Claim 1, further comprising a user-operable button or switch on the apparatus to initialize or shut down the apparatus and an emergency shutdown mechanism comprising a removable pin. Claim 16. The load stability system apparatus of Claim 1, further comprising a remote interactive display comprising a display processor, a screen, an input device, and a display transceiver configured to communicate with the wireless transceiver, wherein the remote interactive display is configured to: receive data wirelessly from the load stability system apparatus via the display transceiver; display, via the screen, indicators of one or more of a position of the apparatus, an orientation of the apparatus, a distance from obstacles, a height above ground, a signal quality of the wireless transceiver, a mode or command state of the processor, an inertial behavior of the load, an energy capacity or available power of the power supply, a work load or power consumption of the two or more thrusters, the thrust from each thruster, a motion or direction of thrust of the apparatus, and a recommended direction for an operator to maneuver a platform suspending the load; and provide user control, via the input device, to set one or more of the mode or command state of the processor, a target position for the apparatus, and activation of an emergency shut off. Claim 17. The load stability system apparatus of Claim 1, wherein the apparatus comprises a self-contained, self-powered, closed-loop stabilization system that continuously counteracts a pendulum-like swing of the suspended load.

Results: 107

1) Family number: 75434649 (US2019241267A)

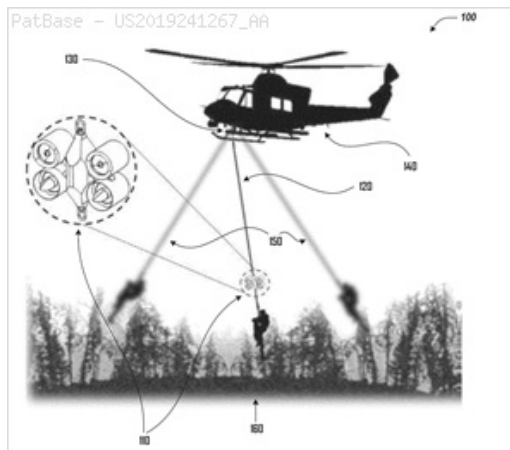
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Title: SUSPENDED LOAD STABILITY SYSTEMS AND METHODS

Abstract: Load stability systems and methods for stabilizing swinging motions of suspended loads. The load stability systems include a fully automated, self-powered device that employs thrust to counteract and control lateral and rotational motion of an external load. The device is a temporary installment on the load, cable, or boom, and is agnostic to the platform from which it is suspended.

Classifications:

International (IPC 8-9): B64C17/00 B64D1/00 B64D1/08 B64D9/00 B66C13/06 B66C13/46 B66C23/58 G05D1/10 H04W4/02 (Advanced/Invention); B64C17/00 B64D1/08 B64D9/00 G05D1/10 (Advanced/Non-invention) **CPC:** H04W4/026 B64D1/08 B64D1/22 B64C17/00 B64D9/00 B66C13/06 B66C13/46 B66C23/58 G05D1/0858 G05D1/10 B64D1/00

**Family:**

Publication number	Publication date	Application number	Application date
AU2019217244 AA	20191003	AU20190217244	20190115
BR112019021673 A2	20200512	BR20191121673	20190115
CL2019002676 U1	20200313	CL20190002676U	20190923
CO20190010905 A2	20200117	CO20190010905	20191001
DE212019000023 U1	20200102	DE201921000023U	20190115
DK2019000074 U1	20191003	DK20190000074U	20190919
DK2019000074 Y3	20191119	DK20190000074U	20190919
ES1241974 UA	20200224	ES20190090015U	20190115
FI12547 U1	20200115	FI20190004123U	20190115
PE20191527 Z	20191023	PE20190001953U	20190115

RU195445 U1	20200128	RU20190129701U	20190115
TR201914340 U5	20191223	TR20190014340U	20190115
US2019241267 AA	20190808	US20190247791	20190115
US10479503 BB	20191119	US20190247791	20190115
WO19156782 A1	20190815	WO2019US13603	20190115

Priority:

US20180627920P 20180208 US20180757414P 20181108 US20190247791 20190115
WO2019US13603 20190115

Probable Assignee: VITA INCLINATA TECHNOLOGIES INC

Assignee(s): (std): VITA INCLINATA TECH INC ; VITA INCLINATA TECHNOLOGIES INC ; VITA INCLINATA TECHNOLOGIES INC

Assignee(s): VITA INCLINATA TECHNOLOGIES

Inventor(s): (std): CALEB B CARR ; CARR CALEB B ; DEREK SIKORA ; GOODRICH LOGAN ; LOGAN GOODRICH ; SIKORA DEREK ; CARR CALEB

Agent(s): GIRL FRIDAY IP PTY LTD; JOHANSSON AND LANGLOIS; JOAN SALVA SALVA; FULYA SUEMERALP; AEON LAW PLLC; PHILIPP ADAM L K; COHEN DAVID V H; COHEN DAVID VH

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

2) Family number: 10215709 (US4747745A)

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Title: Selective beam gantry crane

Abstract: A self-mobile gantry frame has disposed thereon a trolley suspending a load lifting frame. The load lifting frame is stabilized against sway in a direction perpendicular to the gantry beam by a stabilizing beam selectively engageable with the load lifting frame.

Classifications:

International (IPC 8-9): B66C13/06 B66C19/00 (Advanced/Invention)

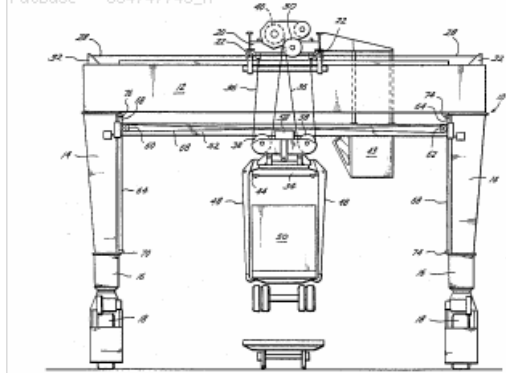
International (IPC 1-7): B66C13/06

CPC: B66C13/06 B66C19/007

European: B66C13/06 B66C19/00F

US: 212/273 212/274 212/319 212/344 414/460

PatBase - US4747745_A



Family:

Publication number	Publication date	Application number	Application date
US4747745 A	19880531	US19870036346	19870409

Priority:

US19850800273 19851121 US19870036346 19870409

Probable Assignee: LETOURNEAU INC

Assignee(s): (std): MARATHON LETOURNEAU CO

Assignee(s): MARATHON LETOURNEAU COMPANY ; LETOURNEAU INC

Inventor(s): (std): PIPPEN HARVEY J ; SCHAPER DONALD W

3) Family number: 1088651 (US3829052A)

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Title: VIBRATION ISOLATOR

Abstract: A vibration isolator for reducing the transmission of vibrations between a supporting body and a body suspended from the supporting body employs suspension cables which are wrapped around a rotatable inertial mass in such a manner that the rotations of the mass will reel in one of the cables while other of the cables are paid out. The cables are connected to cylindrical surfaces of different diameters so that loads transmitted from one of the cables through the rotatable mass to the other cables generate a torque which causes the mass to rotate. A resilient tether connected to the mass urges the mass to rotate toward a static position in which the torque applied to the mass by the tether is balanced by the torque generated by the cables. In the presence of vibratory loads, the tether allows the rotatable mass to oscillate about the static position. By appropriate tuning of the mass and the resilient tether, it is possible to generate an antiresonance condition in which the vibrator isolator exhibits a zero impedance or transmissibility characteristic for vibratory loads of a given frequency.

Classifications:

International (IPC 8-9): F16F15/06 (Advanced/Invention);

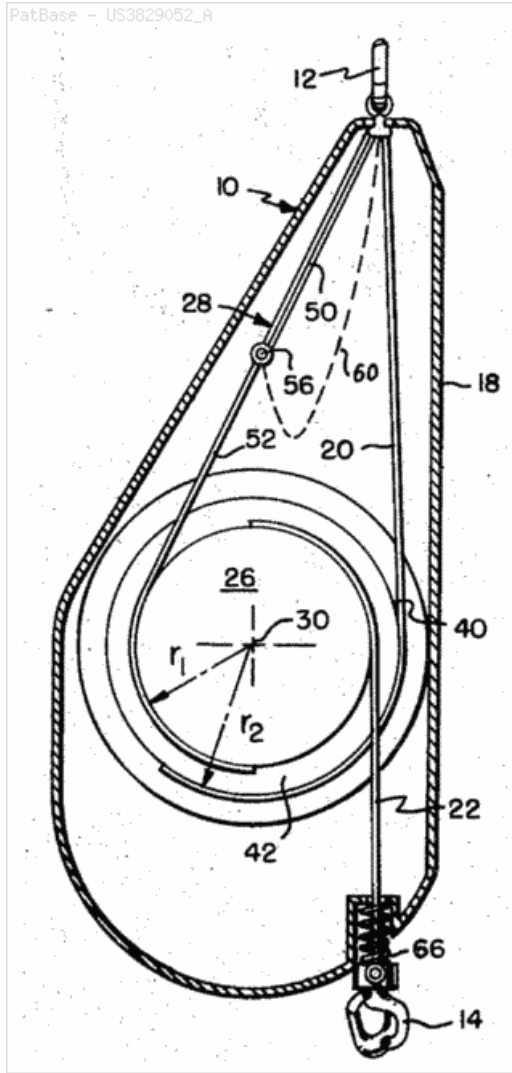
F16F15/06 (Core/Invention)

International (IPC 1-7): F16F15/06

CPC: Y10S84/11 Y10S84/22 F16F15/06

European: F16F15/06

US: 248/31.7 248/317 248/568 248/571 84/DIG.11 84/DIG.22



Family:

Publication number	Publication date	Application number	Application date
US3829052 A	19740813	US19720249131	19720501

Priority:

US19720249131 19720501

Probable Assignee:

KAMAN AEROSPACE CORP

Assignee(s): (std):

KAMAN AEROSPACE CORP

Assignee(s):

KAMAN AEROSPACE CORP US

Inventor(s): (std):

FLANNELLY W

Inventor(s):

FLANNELLY W US

4) Family number: 1096743 (US3838836A)

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Title: METHOD AND APPARATUS FOR LOAD STABILIZATION IN HEAVY LIFT HELICOPTERS

Abstract: The external load produced motions in a heavy lift helicopter are stabilized by dynamically stabilizing the load. A three-point suspension system is used to support the load with each of the points being individually movable in response to sensed conditions of the relative motions of the load and helicopter.

Classifications:

International (IPC 8-9): B64D1/22 (Advanced/Invention);

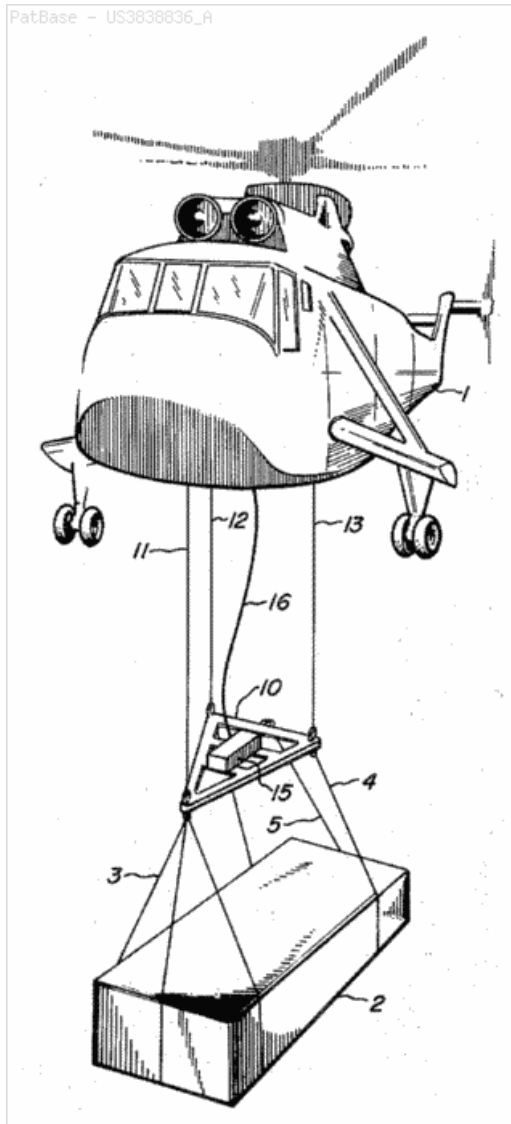
B64D1/00 (Core/Invention)

International (IPC 1-7): B64D9/00

CPC: G05D1/0858 B64D1/22

European: B64D1/22

US: 244/13.7R 244/137.4

**Family:**

Publication number	Publication date	Application number	Application date
US3838836 A	19741001	US19730386809	19730808

Priority:

US19730386809 19730808

Probable Assignee:	CALSPAN CORP
Assignee(s): (std):	CALSPAN CORP
Assignee(s):	CALSPAN CORP US
Inventor(s): (std):	ASSEO S ; WHITBECK R
Inventor(s):	WHITBECK R US ; ASSEO S US

5) Family number: 11070828 (US5190250A)

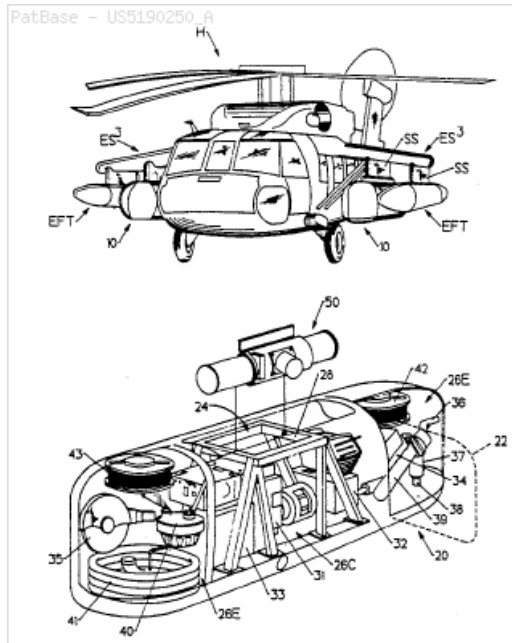
© PatBase

Title: Autonomous, heliborne-mobile construction/emergency pod system

Abstract: An autonomous, heliborne-mobile construction/emergency pod (AHP) system that is structurally and functionally designed and configured to efficiently and expeditiously deploy independently operable, self-contained equipment pods utilizing the operational capabilities provided by helicopters. The AHP system is configured for integration in combination with a helicopter external stores support station. The AHP system includes a dual cable winch and rack (DCWR) assembly and an equipment pod that is configured for provisioning remote and/or inaccessible locations with a full complement of mission specific power actuated equipment and a self-contained power source to facilitate extended mission operations without external support. The DCWR assembly includes a winch subassembly and a suspension rack that provides the mechanical and functional interface between the equipment pod and the winch subassembly and which is operative to lock the equipment pod in combination with the DCWR assembly for up-loading and recovery operations and to release the equipment pod from the DCWR assembly after deployment. The winch subassembly provides the mechanical and functional interface between the suspension rack and the external stores support station and is operative to deploy and recover the equipment pod, suspension rack combination. The AHP system may be used to deploy equipment pods with the helicopter in a hover flight mode or landed.

Classifications:

International (IPC 8-9): B64D1/22 (Advanced/Invention);
 B64D1/00 (Core/Invention)
International (IPC 1-7): B64C1/22
CPC: B64D1/22
European: B64D1/22
US: 244/118.1 244/137.1 244/137.2 244/17.11 254/279 254/286
 D12/327



Family:

Publication number	Publication date	Application number	Application date
US5190250 A	19930302	US19910754787	19910904

Priority:

US19910754787 19910904

Probable Assignee: UNITED TECHNOLOGIES CORP

Assignee(s): (std): UNITED TECHNOLOGIES CORP

Inventor(s): (std): DELONG DENTON ; ENDERS JR RICHARD

6) Family number: 11304770 (US5249652A)

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Title: Two stage damping shock absorber

Abstract: A two-stage shock absorber comprises a casing having a low level damping piston rod therein an end portion of which has two spaced apart flanges thereon with a low resistance fluid path formed therebetween. A floating ring piston is slidably seated about the piston rod between the flanges and has high resistance throughbores therein. When vibrational forces become excessive to a point where one or the other of the flanges engages against the floating ring piston, the low resistance fluid path is closed off by the floating piston and the high resistance throughbores engage within the fluid flow system to cause a shift from primary low level damping to a high level damping. Once pressure within the system equalizes and the ring piston is no longer in contact with either of the flanges, low level damping resumes.

Classifications:

International (IPC 8-9): F16F9/512 (Advanced/Invention);

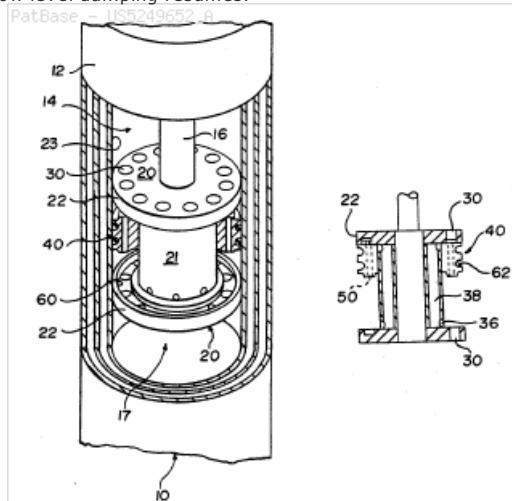
F16F9/50 (Core/Invention)

International (IPC 1-7): F16F9/34

CPC: F16F9/5126

European: F16F9/512P

US: 188/281 188/282 188/317 188/322.15



Family:

Publication number	Publication date	Application number	Application date
US5249652 A	19931005	US19920901452	19920619

Priority:

US19920901452 19920619

Probable Assignee: NAVISTAR INT CORP

Assignee(s): (std): NAVISTAR INT CORP

Assignee(s): NAVISTAR INTERNATIONAL TRANSPORTATION CORP ; NAVISTAR INT

Inventor(s): (std): LEITZMAN NOEL E ; SELZER ROBERT J

Title: Load hook assembly for multiple loads and method of load transport

Abstract: A load hook assembly includes an upright support structure adapted for cable attachment to a lifting instrumentality such as a helicopter. A jaw assembly, carried by the support structure, has multiple, movable jaws which open and close relative a centrally disposed, fixed jaw. Each movable jaw is independently operated by an air cylinder coupled to a jaw associated toggle linkage. The movable jaws and the central, fixed jaw are spaced from one another when closed to permit lateral insertion of a ferrule on a load engaging choker cable. Each movable jaw is controlled in a remote manner by an operator to permit selective release of one or both loads. A method of load transport is also disclosed.

Classifications:

International (IPC 8-9): B64D1/22 B66C1/34 (Advanced/Invention);
B64D1/00 B66C1/22 (Core/Invention)

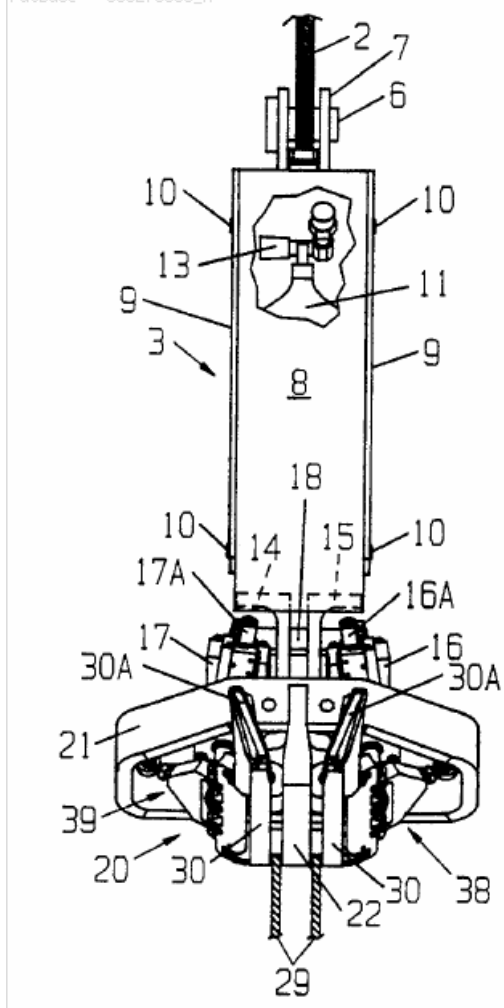
International (IPC 1-7): B66C1/34

CPC: B64D1/22 B66C1/34

European: B64D1/22 B66C1/34

US: 294/82.26 294/82.3 294/82.32 294/823

PatBase - US5273333_R



Family:

Publication number	Publication date	Application number	Application date
US5273333 A	19931228	US19930020355	19930222

Priority:

US19930020355 19930222

Probable Assignee: COLUMBIA HELICOPTERS INC

Assignee(s): (std): COLUMBIA HELICOPTERS INC

Inventor(s): (std): HATFIELD BARRY D ; BURLEY DAVID E ; INGALLS STEVEN L

Title: Aerodynamically-stabilized collapsible personnel and cargo basket for helicopters

Abstract: An aerodynamically-stable collapsible basket for carrying a load suspended from a helicopter having a loaded and an unloaded flight mode is provided. The collapsible basket comprises a grated floor, mesh sides and a lifting harness assembly. The floor supports the load and comprises a rectangular bottom frame and a grate having four ends. Each end of the grate connects to a different side of the rectangular bottom frame. Apparatus for aerodynamically stabilizing the basket comprises collapsible side-frame assembly having four rectangular side frames pivotally mounted to different sides of the rectangular bottom frame. Stabilization of the basket results from airflow patterns developed by mesh screen sides attached to the basket and the floor grating. Apparatus for attaching the basket to the helicopter comprises two pairs of hooks, each pair being oppositely attached to the top ends of two oppositely-facing side frames.

Classifications:

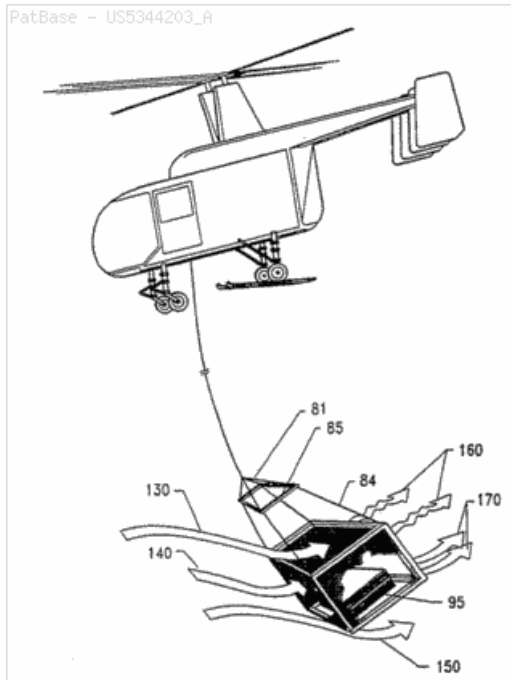
International (IPC 8-9): B64D1/22 B65D6/08
B65D88/52 (Advanced/Invention)

International (IPC 1-7): B64D9/00 B65D6/08

CPC: B64D1/22 B65D7/26 B65D88/522 B66F11/04

European: B64D1/22 B65D7/26 B65D88/52A B66F11/04

US: 244/137.1 294/68.1 294/68.3

**Family:**

Publication number	Publication date	Application number	Application date
US5344203 A	19940906	US19930002829	19930108

Priority:

US19920848310 19920309 US19930002829 19930108

Probable Assignee: PRECISION LIFT SER VICES LLC

Assignee(s): (std): TOLLENAERE DONALD J

Assignee(s): PRECISION LIFT SER VICES LLC

Inventor(s): (std): TOLLENAERE DONALD J

9) Family number: 1168885 (US3904156A)

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Title: EXTERNAL LOAD STABILIZATION APPARATUS

Abstract: In the history of helicopters and similar aircraft carrying cargo externally, a need has been established for an effective load stabilization system. The apparatus provided herein not only improves external load modal damping, provides the pilot command control augmentation of the load, and minimizes pilot induced oscillation, but is universally adaptable to a wide variety of helicopters. The apparatus contemplates rigid pendants which damp load motion in response to a sensor. 13 Claims, 9 Drawing Figures

Classifications:

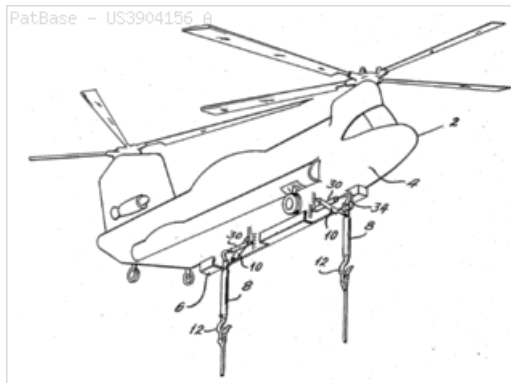
International (IPC 8-9): B64D1/22 B66C13/06 (Advanced/Invention); B64D1/00 B66C13/04 (Core/Invention)

International (IPC 1-7): B64D9/00

CPC: B64D1/22 B66C13/06 G05D1/0858

European: B64D1/22 B66C13/06

US: 212/273 244/118.1 244/118R 244/137.4 244/3

**Family:**

Publication number	Publication date	Application number	Application date
US3904156 A	19750909	US19740487837	19740711

Priority:

US19740487837 19740711

Probable Assignee: US ARMY

Assignee(s): (std): US ARMY

Assignee(s): SECRETARY OF ARMY AS US GOV ; THE UNITED STATES OF AMERICA AS REPRESENTED BY THE SECRETARY OF THE ARMY

Inventor(s): (std): SMITH JAMES H

Title: HOIST RING WITH SELF-LOCK RETAINING RING

Abstract: The present invention is a hoist ring provided with a central screw having a screw head at one end and a threaded shank at an opposite end. A washer is provided between the screw head and a lower bushing, with the lower bushing being secured on the screw with a self-lock retaining ring which inserts into a lower recess provided in the lower bushing. The self-lock retaining ring is provided with teeth for gripping the threaded shank. An upward oriented sleeve provided on the lower bushing extends upward to the washer. A body rotatably mounts around the sleeve by means of an axial bore provided in the body. A bail pivotally mounts to the body on an axis transverse to an axis of the lower bushing by means of shoulder pins which insert into horizontal bores of the body and which are secured therein by roll pins. The roll pins insert through vertical bores in the body and through aligned holes in the shoulder pins and are held in place by the washer and lower bushing. The bail is attachable to a load and the threaded shank is attachable to a base.

Classifications:

International (IPC 8-9): B66C1/66 F16G15/08 (Advanced/Invention); B66C1/62 F16G15/00 (Core/Invention)

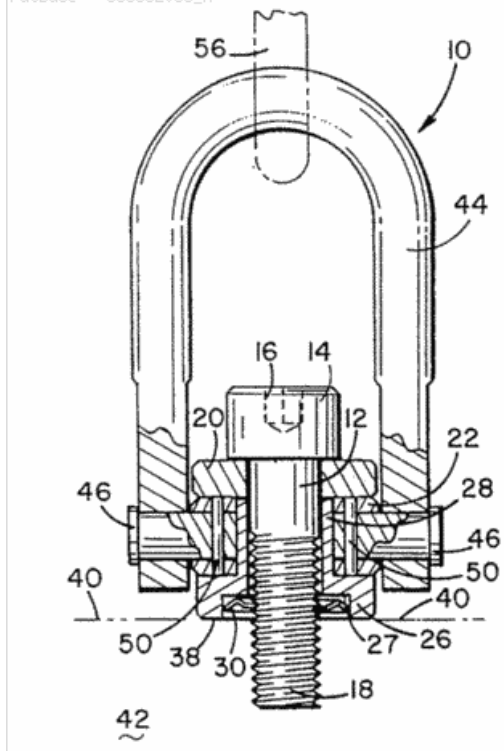
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CPC: F16G15/08 B66C1/66 Y10T403/32041 Y10T403/32213 Y10T403/32221

European: B66C1/66 F16G15/08

US: 294/82.1 294/821 403/57 403/78 403/79 411/353

PatBase - US5352056_A



Family:

Publication number	Publication date	Application number	Application date
US5352056 A	19941004	US19920982783	19921130

Priority:

US19920982783 19921130

Probable Assignee: CROSBY GROUP

Assignee(s): (std): CROSBY GROUP

Assignee(s): CROSBY GROUP INC ; THE CROSBY GROUP INC

Inventor(s): (std): CHANDLER WILLIAM M

Title: Anti-sway control for rotating boom cranes

Abstract: A process for anti-sway control of a rotating boom or other three-degree-of-freedom crane wherein the load is hoisted, at variable hoist lengths, by a cable suspended from a point that can be moved in space in three dimensions, either freely, or under known constraints. Initial acceleration of the load induces an initial sway to the load. A second lateral acceleration, equal to the first lateral acceleration, is scheduled to be applied one-half a sway period later to remove the sway induced by the first acceleration. A third acceleration is applied to correct for half the excess sway induced by hoisting, by non-linearities in the pendulum, and by crane platform motion; and a fourth acceleration, of equal magnitude as the third but in the opposite direction, is scheduled for one-half a sway period later, to correct the remaining half of the excess sway energy. The first and third accelerations are constrained by the ability of the crane to execute them and to execute the delayed second and fourth accelerations. The lateral accelerations are applied additively, and repeated sequentially at a variable rate, to accelerate the load from its initial location to objective velocities and locations under controlled anti-sway conditions.

Classifications:

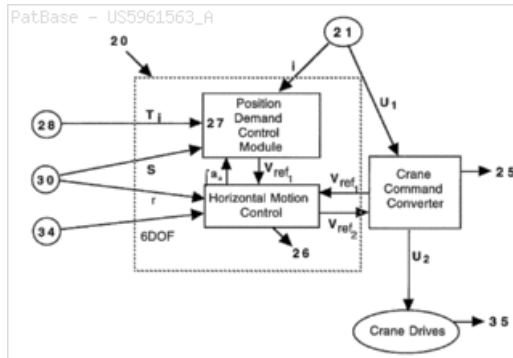
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International (IPC 1-7): B66C13/06

CPC: B66C13/063

European: B66C13/06B

US: 212/272 212/273 212/275 701/50



Family:

Publication number	Publication date	Application number	Application date
US5961563 A	19991005	US19970786275	19970122

Priority:

US19970786275 19970122

Probable Assignee: DANIEL H WAGNER ASSOCIATES INC

Assignee(s): (std): DANIEL H WAGNER ASSOCIATES

Assignee(s): DANIEL H WAGNER ASSOCIATES INC ; NAVY SECRETARY OF UNITED STATES OF AMERICA

Inventor(s): (std): OVERTON ROBERT H

12) Family number: 11915855 (US4881601A)

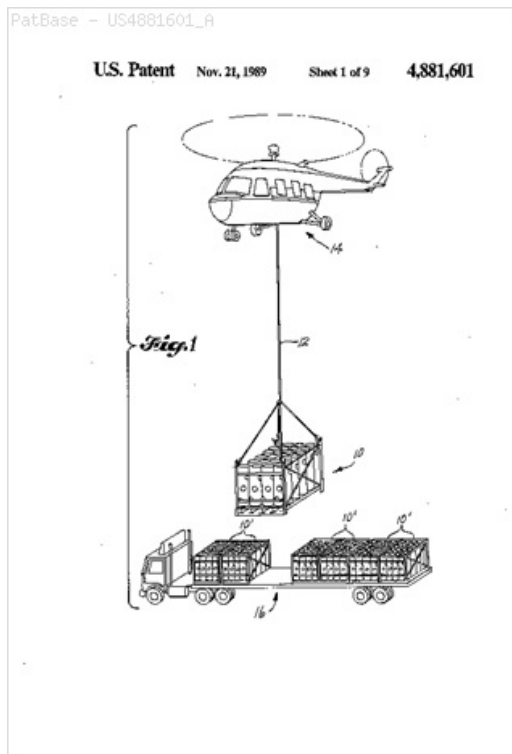
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Title: Apparatus for deployment of aerial-drop units

Abstract: Disclosed is an apparatus which carries and selectively deploys aerial-drop units. The apparatus comprises a plurality of substantially parallel tubes, each tube being sized to hold a stack of units and is suspendible from an aircraft by a carrier. Associated with each of the tubes is a releasable unit support element which, upon release, allows a stack of units, as its support is removed, to drop by gravity from the tube.

Classifications:

International (IPC 8-9): B64D1/02 B64D1/16 (Advanced/Invention);
A62C3/02 (Advanced/Non-invention);
B64D1/00 (Core/Invention);
A62C3/00 (Core/Non-invention)
International (IPC 1-7): A62C27/30 A62C28/00 B64D1/02 B64D1/16
F41F5/02
CPC: A62C3/0235 B64D1/02 B64D1/16
European: B64D1/02 B64D1/16 K62C3/02H2
US: 169/53 244/136 244/1TD 89/1.54 89/1.59



Family:

Publication number	Publication date	Application number	Application date
EP0412209 A1	19910213	EP19890201973	19890726
US4881601 A	19891121	US19880195212	19880518

Priority:

US19880195212 19880518 EP19890201973 19890726

Probable Assignee: SMITH WAYNE D

Assignee(s): (std): SMITH WAYNE D

Inventor(s): (std): SMITH WAYNE D

Designated states: AT BE CH DE ES FR GB GR IT LI LU NL SE

Title: Electronic antisway control

Abstract: The invention is for the electronic control of the sway of a suspended load from a crane. The natural frequency ω_n of a simple pendulum is used to estimate the velocity and displacement of the suspended load, and a signal representative of measured load displacement is used to drive the estimated load displacement to the measured load displacement and modify the estimated velocity.

Classifications:

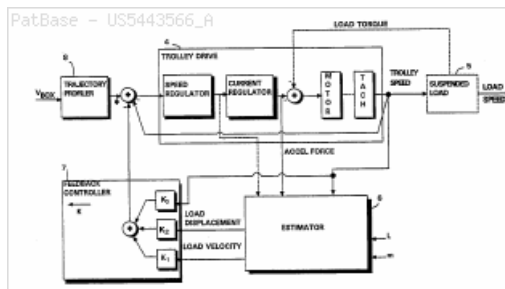
International (IPC 8-9): B66C13/06 B66C13/22 (Advanced/Invention)

International (IPC 1-7): B66C13/06

CPC: B66C13/063 B66C13/22

European: B66C13/06B B66C13/22

US: 212/275



Family:

Publication number	Publication date	Application number	Application date
US5443566 A	19950822	US19940247687	19940523

Priority:

US19940247687 19940523

Probable Assignee: GENERAL ELECTRIC CO

Assignee(s): (std): GEN ELECTRIC

Assignee(s): GENERAL ELECTRIC CO ; GENERAL ELECTRIC COMPANY

Inventor(s): (std): RITTER ALLEN M ; BRUKALO KRZYSTOF Z ; RUDDY THOMAS A ; RUSHMER MICHAEL W

Title: AUTOMATIC RELEASE OF A LOAD FROM A HELICOPTER EXTERNAL CARGO SUSPENSION SYSTEM

Abstract: A helicopter external cargo suspension system (12) has load sensors (19,20) at each suspension point for sensing the magnitude of a load (32) at each suspension point. A delay period (Fig. 6) is determined based on the magnitude of the load, and a load is released if one of the following failure modes occurs for a period which exceeds the delay period: one of the suspension points is unloaded, the magnitude of the load exceeds a maximum threshold magnitude, or if the distribution of the load, as indicated by the difference in magnitude at each suspension point, exceeds a difference threshold magnitude. If the magnitude of the load is below a minimum threshold magnitude, the load will be carried by one of the suspension points in response to a failure of the other suspension points. Alternatively, the load information is converted from crisp values to fuzzy inputs (700) wherein the detected values are fuzzified by assigning a membership weight at discrete points or segments on a normalized scale; a new mode fuzzy output (707) is provided by applying a compositional rule of inference (705) across each fuzzy input (702) and a composite mode selection rule base (710), the new mode fuzzy output (707) is converted into a crisp output by taking the weighted sum of the membership weight at each point on the normalized scale in excess of a threshold value (712), and new mode is determined by comparing the new mode crisp output to a set of new mode membership ranges (FIGS. 8e and 9e).

Classifications:

International (IPC 8-9): B64D1/12 (Advanced/Invention);

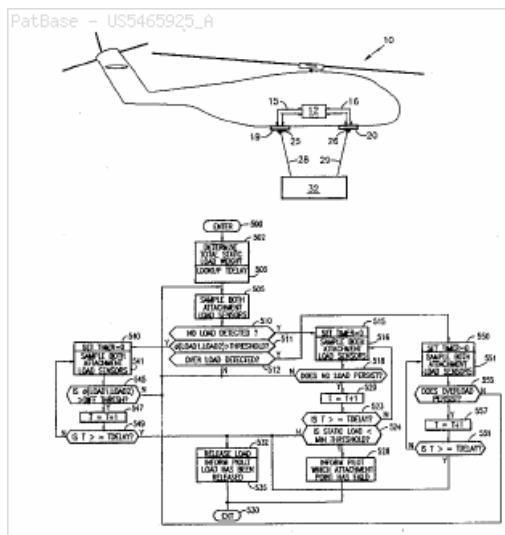
B64D1/00 (Core/Invention)

International (IPC 1-7): B64D1/12

CPC: B64D1/12 Y10S706/90

European: B64D1/12

US: 244/137.1 244/137.4 395/900 414/21 706/900



Family:

Publication number	Publication date	Application number	Application date
US5465925 A	19951114	US19940250988	19940527

Priority:

US19940250988 19940527

Probable Assignee: UNITED TECHNOLOGIES CORP

Assignee(s): (std): UNITED TECHNOLOGIES CORP

Inventor(s): (std): SMITH MATTHEW T ; PAWLOWSKI JOHN J ; MANKAUKAS JOSEPH J ; LAWRENCE THOMAS H ; CONNOLLY CHRISTOPHER J

Title: Autojettison method and apparatus for dual-point suspension systems

Abstract: A method and apparatus for automatically jettisoning cargo carried by a dual-point suspension system when a suspension system failure is detected. Three conditions must be satisfied before a load is jettisoned. The average value of the load and an instantaneous value of the load on a hook must have fallen below a threshold value (zero load condition). A threshold amount of the load must have shifted from one hook to the other (dynamic load split condition). A threshold amount of an initial hook load must have been lost within a short period of time (rapid rate-of-decrease condition). For all three conditions, the threshold amount or value is adaptively set based on the actual load carried by the dual-point suspension. If all three conditions are satisfied for either the forward or the aft hook, the cargo is jettisoned. Additionally, a fourth condition that detects whether a structural limit of a hook has been exceeded is evaluated. If the structural limit has been exceeded, the load is jettisoned.

Classifications:

International (IPC 8-9): B64D1/12 (Advanced/Invention);
B64D1/00 (Core/Invention)

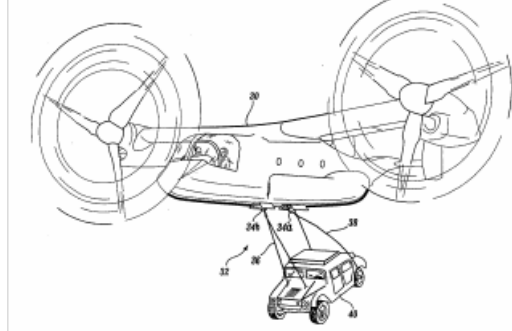
International (IPC 1-7): B64D1/12

CPC: B64D1/12

European: B64D1/12

US: 244/118.1 244/137.1 244/137.4 244/2 244/3

PatBase - US5499785_R



Family:

Publication number	Publication date	Application number	Application date
US5499785 A	19960319	US19940306745	19940915

Priority:

US19940306745 19940915

Probable Assignee: BOEING CO

Assignee(s): (std): BOEING CO

Assignee(s): THE BOEING COMPANY

Inventor(s): (std): ROBERTS JAMES P ; CULP JAMES D ; MILLER DAVID G ; SANSFIELD MARTIN R