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(54) Title: STABILIZED PLATFORM FOR CAMERA

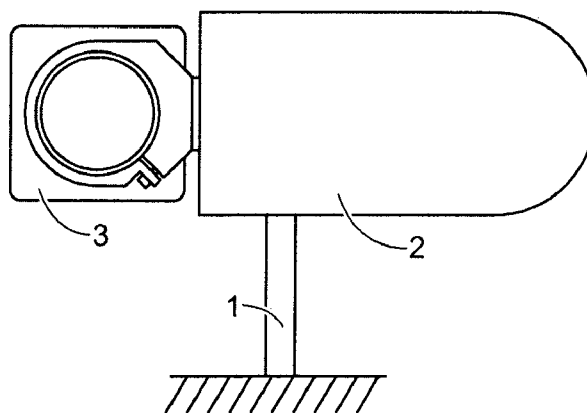


Fig. 1

(57) Abstract: The invention is related to controlled mechanical platforms for video cameras. A device rotating on a support allows control and stabilization of the position of a camera being rotatable in three dimensions. The construction described above can improve stability of the platform. Vibration level transmitted from the unstable base to the platform is reduced. Areas of application: portable stabilizers for operators, installation of cameras on vehicles, cranes and cables, unmanned machines.

STABILIZED PLATFORM FOR CAMERA

This invention relates to platforms for video cameras for rotation in multiple directions at the point of intersection of the axes of rotation.

5 Position and stability of video cameras can be controlled using a platform having center of mass of a stabilizing part coinciding with axes of rotation. US patent application No. 12/669,480 and Chinese patent application No. 20111380351.6 describes mechanisms in which a video camera is located in the center of the rotating unit. Locking elements for axes and servo drives are mounted on the sides.
10 The axes are fixed to the frames encircling the camera, making said frames quite large. Large frames have disadvantages such as reduced structural rigidity, increased errors in the production and operation, increased loads on bearings. Amplitude of oscillations of the video camera with a telephoto lens can be reduced by reducing frictional forces at the nodes of rotation. This can be achieved by increasing
15 manufacturing accuracy of the axial units and reducing bearings loads.

Purpose of the invention is to reduce friction forces in units of rotation between unstable base and stable platform and increase rigidity of the construction.

Mentioned disadvantages are overcome by the use of a compact unit of rotation, locating a video camera at the side and balancing it by a counterweight on
20 the opposite side of the axial unit.

Figure 1 shows front view of an example of the structure for stabilizing a platform.

Figure 2 shows top view of an axial unit.

Figure 3 shows side view of an axial unit.

25 The stabilized platform comprises a leg (1), a housing (2), a video camera (3), axis (4), a horizontally rotating unit (5), a servo drive (6, 9, 10), axes (7, 12), a transversely tiltable frame (8), longitudinally tiltable frame (11), mounting slots (13), adjustable platform (14).

Figure 4 shows the prior art, where the stabilized platform has a rotating load
30 (15), a frame (16), position of a first bearing (17), position of a second bearing (18), where the direction of gravitational force (19) is equal to the mass of a rotatable load, a bearing is being loaded by proportional load (20), the distance between bearings is L_1 and the distance of the lever arm is L_2 .

According to the invention, a device rotating on a support is attached to unstable base via a leg (1). The leg (1) can be directed upwards or downwards and is equipped with a panoramic rotation axis (4). The servo drive (6) and the transverse tilting axis (7) are mounted in a horizontally rotating unit (5). Axes of the second servo drive (9) and the third servo drive (10) are secured on the frame (8), being tiltable in a transverse plane. The housing (2) is also mounted to said frame (8). The axes (12) of longitudinal inclination are mounted on the longitudinally tiltable frame (11), having slots (13) for fastening equipment for stabilization. Platform (14) for stabilized equipment allows to relocate the equipment in three directions to achieve precise balance of a rotating mass. Video camera (3) is mounted on one side of the device. On the opposite side, the following equipment is secured: a position sensor of the stabilized platform, a servo drive controller, a battery. The servo drive is further equipped with internal feedback of the acting force. A mechanical gyroscope may be used to achieve even greater stabilization. Installation of two cameras on opposite sides allows stereoscopic shooting.

The described structure of the device for rotation and stabilization of a video camera allows production of a compact axial unit with increased rigidity and precision. Centre of mass of rotation is situated between two bearings, thus load on bearings does not exceed weight of the load. By reducing frictional forces, vibrations of the unstable base transmitted to the stabilized platform are also reduced. Centers of mass of the stabilized equipment are spaced apart, enhancing the effect of additional inertial stabilization.

Areas of application: portable stabilizers for operators, installation of cameras on vehicles, cranes and cables, unmanned machines.

Claims

1. Stabilized platform for video cameras, comprising gimbal with three controlled axes
5 of rotation, where the axis of panorama is connected to the unstable base and the
stabilized part is mounted on the axes of the longitudinal inclination, c h a r a c t e r
i z e d in that the mounting slots (13, 14) for the stabilized equipment (3) are
provided on the axis (12) of longitudinal inclination on its opposite sides in such a
10 way that the horizontal axis unit is located between the balanced elements of the
stabilized equipment.
2. Stabilized platform for video cameras according to claim 1, c h a r a c t e r i z e d
in that it comprises a frame (8) with two servo drives (9, 10) fixed thereon, where
axes (7, 12) of said servo drives are perpendicular one to another, the axis (7) of
15 the first servo drive (9) is directed the center of the frame, axis (12) of the second
servo drive (10) is directed outwards.
3. Stabilized platform for video cameras according to claim 1, c h a r a c t e r i z e d
in that the rotatable equipment is secured on a rectangular frame having U-shape
20 (11) which is mounted on two axes (12).
4. Stabilized platform for video cameras according to claim 1, c h a r a c t e r i z e d
in that the servo drives with acting force internal feedback are used for rotation
and stabilization.

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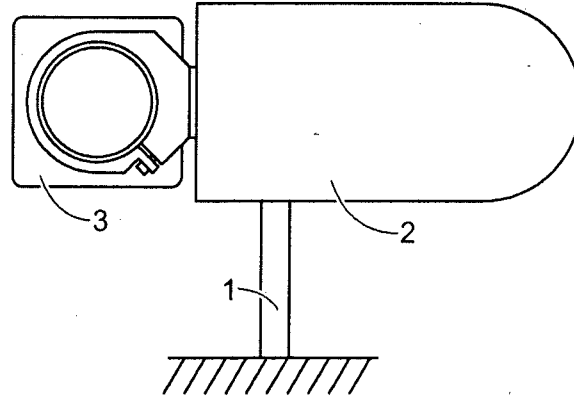


Fig. 1

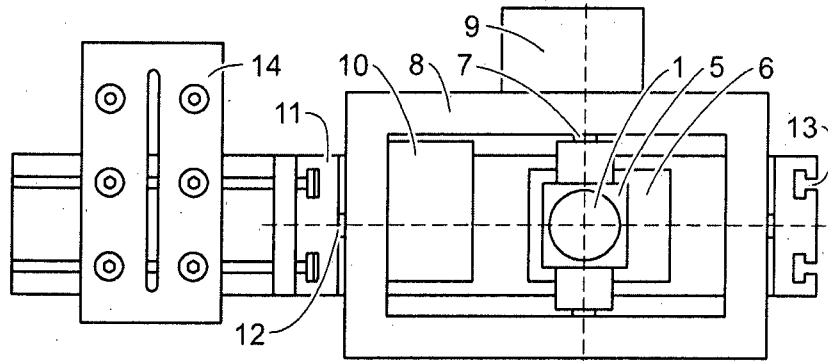


Fig. 2

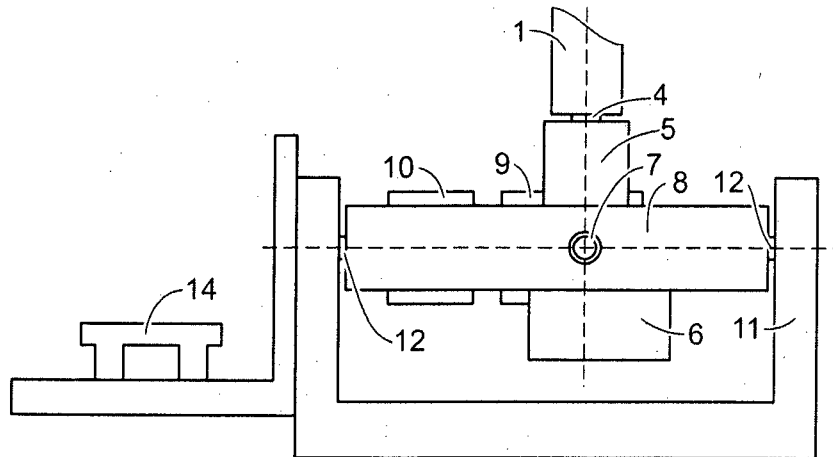


Fig. 3

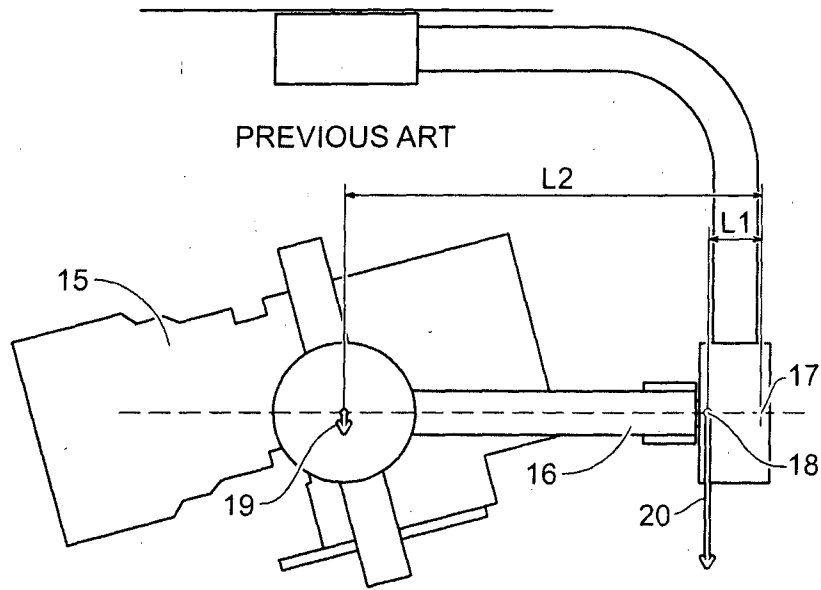


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/LT2014/000015

A. CLASSIFICATION OF SUBJECT MATTER
 INV. F16M11/10 F16M11/12 F16M11/18 F16M11/20 G03B17/56
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 F16M G03B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 8 434 950 B1 (WAWRO CHRISTOPHER [US]) 7 May 2013 (2013-05-07) column 3, line 45 - column 6, line 15 figures 1,2 -----	1-4
X	FR 2 715 236 A1 (LAUNAY OLIVIER ROGER HENRI [FR]) 21 July 1995 (1995-07-21) page 1 - page 5 figures 1-4 -----	1-4
X	EP 1 912 015 A2 (HONEYWELL INT INC [US]) 16 April 2008 (2008-04-16) paragraph [0027] figures 1,2,6 -----	1-4
X	US 2005/052531 A1 (KOZLOV VLADIMIR V [RU] ET AL) 10 March 2005 (2005-03-10) figures 2-8 paragraph [0061] - paragraph [0065] -----	1-4

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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- "P" document published prior to the international filing date but later than the priority date claimed

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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