



(51) International Patent Classification:

*F16M 11/10* (2006.01)      *F16M 11/20* (2006.01)

*F16M 11/12* (2006.01)      *G03B 17/56* (2006.01)

*F16M 11/18* (2006.01)

(21) International Application Number:

PCT/LT2014/000015

(22) International Filing Date:

23 December 2014 (23.12.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2014 012      5 February 2014 (05.02.2014)      LT

(71) Applicant: **MY RESEARCH, UAB** [LT/LT]; Laisvės pr. 95-31, LT-06122 Vilnius (LT).

(72) Inventor: **ZAICEVSKIJ, Aleksej**; s.b. Saida, sk. 188, Vo-syliškių k., LT-21401 Trakų r. (LT).

(74) Agent: **KLIMAITIENĖ, Otilija**; AAA Law, J. Jasinskio g. 16A, PO Box 33, LT-03163 Vilnius (LT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: STABILIZED PLATFORM FOR CAMERA

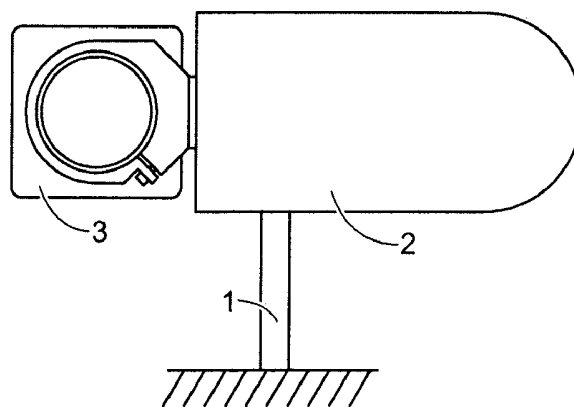


Fig. 1

(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.

WO 2015/119488 A1

## 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  
way that the horizontal axis unit is located between the balanced elements of the  
10 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.

1/2

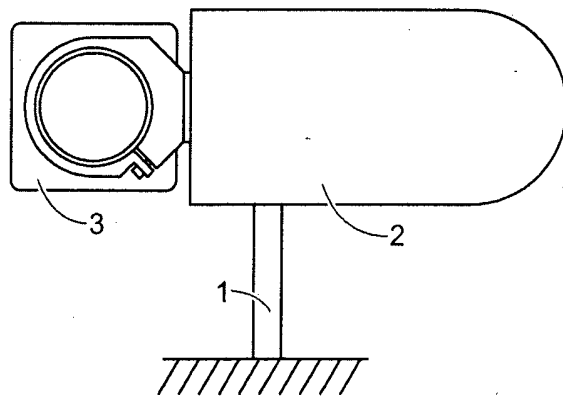


Fig. 1

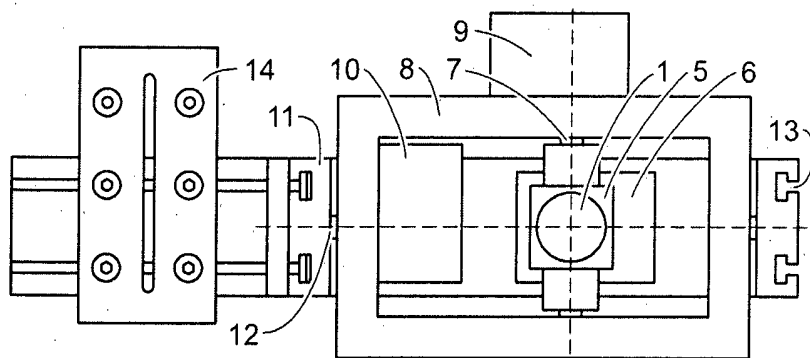


Fig. 2

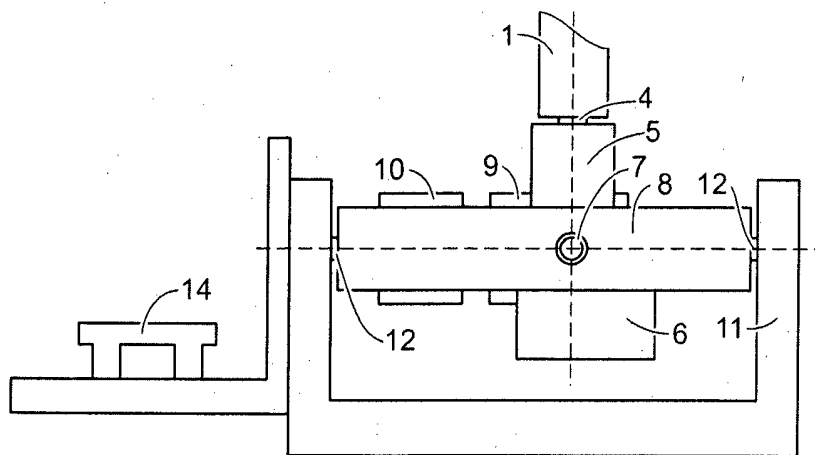
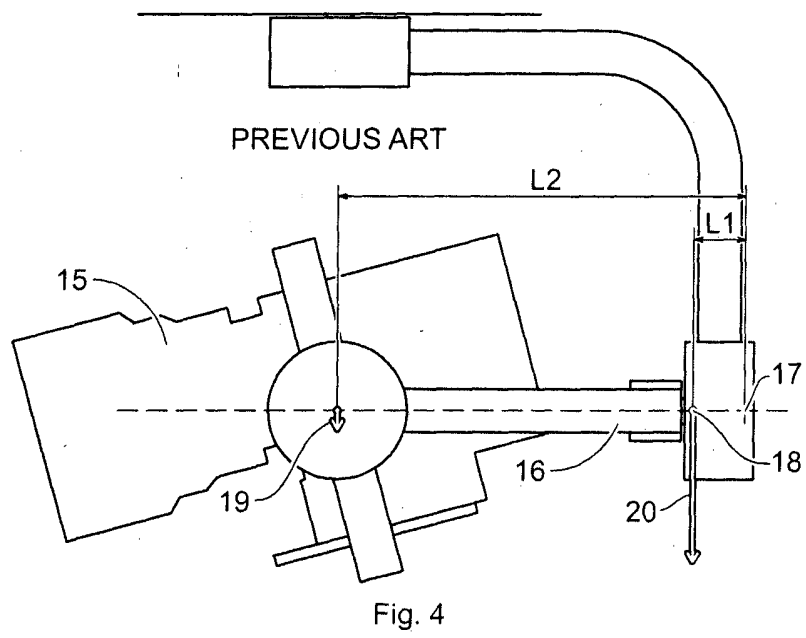


Fig. 3



# INTERNATIONAL SEARCH REPORT

International application No PCT/LT2014/000015
---

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> 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>B. FIELDS SEARCHED</b>		
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		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
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
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
Date of the actual completion of the international search	Date of mailing of the international search report	
16 July 2015	22/07/2015	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Terrier de la Chaise	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/LT2014/000015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 8434950	B1	07-05-2013	US RE44984 E1 01-07-2014 US 8434950 B1 07-05-2013
-----			
FR 2715236	A1	21-07-1995	NONE
-----			
EP 1912015	A2	16-04-2008	EP 1912015 A2 16-04-2008 JP 2008180372 A 07-08-2008 US 2008210025 A1 04-09-2008
-----			
US 2005052531	A1	10-03-2005	US 2005052531 A1 10-03-2005 US 2007182813 A1 09-08-2007 US 2012200722 A1 09-08-2012 US 2013286233 A1 31-10-2013
-----			