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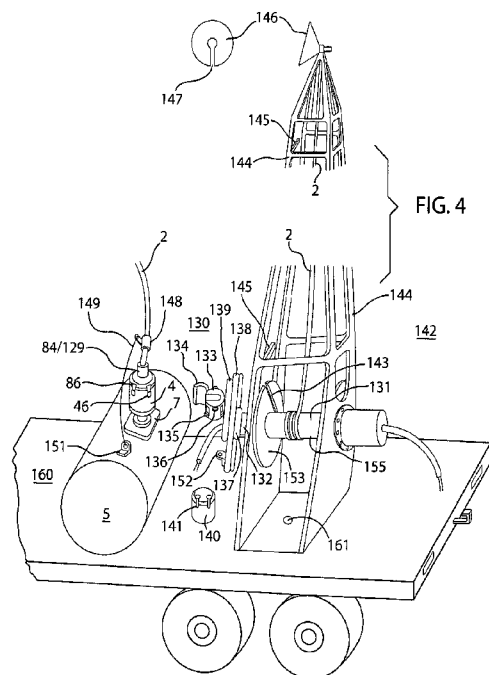
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Published:

- 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))

(88) Date of publication of the international search report:
5 February 2015

(54) Title: AEROSTAT ANCHORING, DEPLOYMENT, EXTENDED DURATION AND RECOVERY APPARATUS



(57) Abstract: A tethered aerostat with a ground based deployment, extended duration and recovery system to accommodate a weather vaning deployed aerostat while maintaining a supply of a lift gas by having a rotatable tether pipe and a hollow tether. Included is a rotatable tether pipe device assembly with rotor and stator components disposed in an air tight housing assembly to provide a ground based gas maintenance system. An aerostat deployment buoyancy control maintenance and combined recovery platform is provided. The tethered aerostat systems and method increase deployment duration and allow more systems to be controlled and maintained on the ground without interrupting aerostat operational capabilities.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/00145

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B64B 1/66 (2014.01)

CPC - B64B 1/66

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)

IPC(8): B64B 1/66 (2014.01)

CPC: B64B 1/66

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

IPC(8): B64B 1/60, B64B 1/50; USPC: 244/30, 244/33

CPC: B64F 3/00, B64B 1/50 (search term limited; see below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase (All); Google (Web, Patents, Scholar)

Search terms: aerostat, tether*, hose, line, air line, air hose, slip ring, pancake slip ring, stator plate, stator, rotor, bearing*, ballonet, airship, blimp, tapered roller bearings, roller bearings, detachable tether, compressed air, ground, control

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008/0265086 A1 (LEE) 30 October 2008 (30.10.2008), entire document, especially Fig 1, 2A, 2B, 3, 4A, 4B, 5, 7 and 8, para [0014], [0021], [0024]-[0025], [0038], [0043]-[0044], [0058]-[0061], [0065], [0072]-[0074] and [0080]	1-50
A	US 2012/0181380 A1 (VAN STAAGEN et al) 19 July 2012 (19.07.2012), entire document, especially Fig 1-2, para [0016] and [0019]	1-50
A	US 2011/0101692 A1 (BILANIUK) 05 May 2011 (05.05.2011), entire document, especially Fig 5a and 7	1-50
A	US 2010/0133385 A1 (OLSON) 03 June 2010 (03.06.2010), entire document, especially Abstract	1-50
A	US 6,325,330 B1 (LAVAN Jr) 04 December 2001 (04.12.2001), entire document, especially Fig 1, col 4, ln 41-67	1-50

☐ Further documents are listed in the continuation of Box C.


* 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

17 October 2014 (17.10.2014)

Date of mailing of the international search report

25 NOV 2014

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
---SEE EXTRA SHEET---

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

-*Box No. III - Observations where unity of invention is lacking-*

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

Group I, claims 1-27, drawn to an aerostat anchoring device

Group II, claims 28-50 drawn to a tethered aerostat deployment and maintenance apparatus, and methods of use thereof

The groups of inventions listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special features for the following reasons:

The special technical feature of Group I is the combination of an air tight anchoring vessel housing with a stator and rotor in sealed engagement, not required by the claims of Group II.

The special technical feature of Group II is the combination of a lift gas replenishment tank, detachable tether pipe assembly, hollow tether, tether spool, and capture bracket, not required by the claims of Group I.

Groups I and II do not share any technical features except for the general anchoring of an aerostat, which was well-known in the art as evidenced by, for example, US 4,402,479 A to Phipps, III et al. (see title, abstract, drawings, etc.).

Therefore, the inventions of Groups I and II lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.