



- (51) International Patent Classification:
B01F 11/00 (2006.01)
- (21) International Application Number:
PCT/US2014/015804
- (22) International Filing Date:
11 February 2014 (11.02.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/763,029 11 February 2013 (11.02.2013) US
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- (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, LT, 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, 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).

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 November 2015

(54) Title: APPARATUS AND METHOD FOR PROVIDING ASYMMETRIC OSCILLATIONS

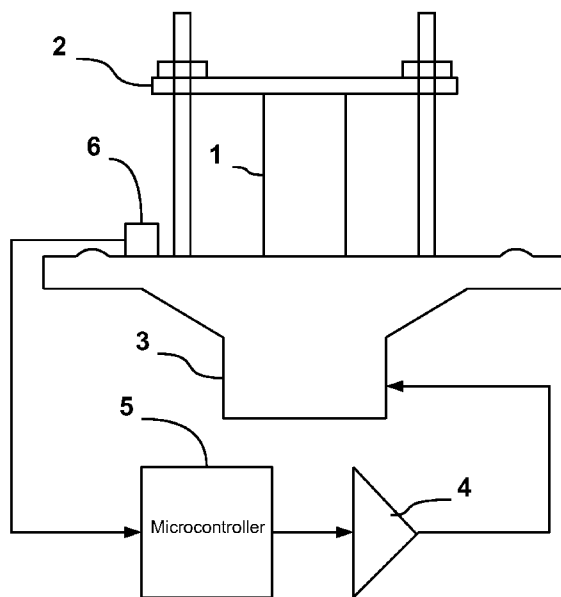


FIG. 1

(57) Abstract: Disclosed is an apparatus and method for providing asymmetric oscillations to a container. The container may include a fluid, a particle, and/or a gas. A vibration driver attached to the container provides asymmetric oscillations. A controller connected to the vibration driver controls an amplitude, frequency, and shape of the asymmetric oscillations. An amplifier amplifies the asymmetric oscillations in response to the controller. A sensor disposed on the vibration driver provides feedback to the controller.

WO 2014/124440 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 14/15804

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B01F 11/00 (2015.01)
CPC - B01F 11/00; B01F 11/004; B01F 11/0054; B01F 11/0094
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)- B01F11/00 (2015.01)
CPC-B01F11/00; B01F11/004; B01F11/0054; B01F11/0094

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8)- B01F11/00 (2015.01)
CPC-B01F11/00; B01F11/004; B01F11/0054; B01F11/0094; USPC-366/108, 110, 111, 113, 124

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Proquest Dialog, Google Patents, Google Scholar
Search terms used: asymmetric, vibration, oscillation, motion, velocity, particle, bubble, microparticle, fluid, liquid, waveform, sinusoidal, harmonic, non-linear, drag, feedback, sensor, detector, monitor, accelerometer, levitate, float

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2,766,881 A (WESTERVELT et al.) 16 October 1956 (16.10.1956), Fig 6, col 5, ln 75 ? col 6, ln 7, col 8, ln 15-44	1, 3-6, 10
X --- Y	US 2011/0163013 A1 (LURZ et al.) 07 July 2011 (07.07.2011), Fig 2a, 5, abstract, para [0029], [0034], [0144], [0211], [0212], [0215]	1, 2, 7, 9, 11-14, 16-19 ----- 8, 15
Y	WO 2008/088321 A1 (HOWE et al.) 24 July 2008 (24.07.2008), abstract	8, 15

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
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"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	

Date of the actual completion of the international search
13 August 2015 (13.08.2015)

Date of mailing of the international search report
14 SEP 2015

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