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- (71) **Applicant:** HUTCHINSON TECHNOLOGY INCORPORATED [US/US]; 40 West Highland Park Drive N.E., Hutchinson, Minnesota 55350-9784 (US).
- (72) **Inventors:** BJORSTROM, Jacob, D.; 945 Thomas Avenue SW, Hutchinson, Minnesota 55350 (US). MILLER, Mark, A.; 68224 215th Street, Darwin, Minnesota 55324 (US).
- (74) **Agents:** SHERBURNE, Paul et al.; Faegre Baker Daniels LLP, 2200 Wells Fargo Center, 90 South Seventh Street, Minneapolis, Minnesota 55402 (US).

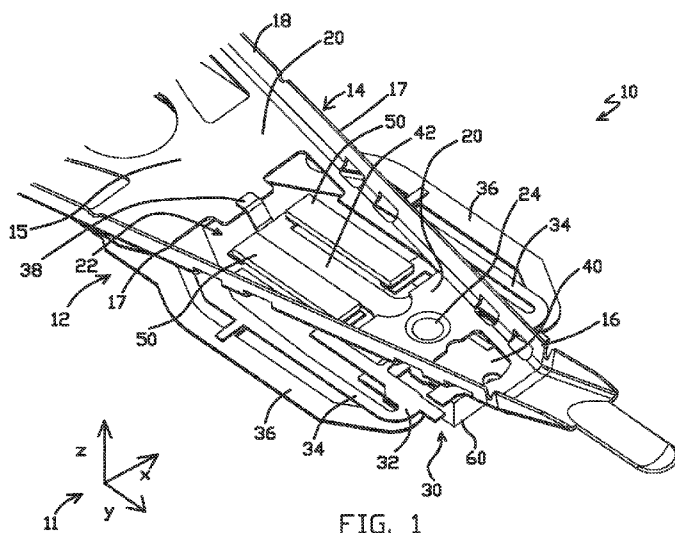
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— with international search report (Art. 21(3))

[Continued on next page]

(54) **Title:** GIMBAL-BASED DUAL STAGE ACTUATION DISK DRIVE SUSPENSIONS

(57) **Abstract:** Various embodiments concern a dual stage actuation suspension that comprises a loadbeam having a load point projection. The suspension further comprises a gimbal assembly having a point of contact that is in contact with the load point projection such that the gimbal assembly can gimbal about the load point projection. The gimbal assembly is cantilevered from the loadbeam and has an axis of rotation aligned with the load point projection and the point of contact. The suspension further comprises a pair of motors mounted on the gimbal assembly and positioned proximal of the point of contact. The pair of motors is mounted between a tongue and a pair of spring arms to rotate the tongue about the point of contact and the load point projection. The loadbeam further comprises a void into which the pair of motors extends.



— *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))*

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INTERNATIONAL SEARCH REPORT

PCT/US14/52042 13.03.2015

International application No.

PCT/US14/52042

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G11B 5/48, 5/55 (2015.01)

CPC - G11B 5/482, 5/4826, 5/4833

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) Classification(s): G11B 5/48, 5/55 (2015.01)

CPC Classification(s): G11B 5/482, 5/4826, 5/4833; USPC Classification(s): 360/245.2, 245.7, 294.3, 294.4

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)

PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data): disk drive, microactuator, load beam, flexure, tongue, gimbal, spring, flex, bend, rotate, pivot, axis, motors, piezos, void, window, hole, opening, metal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 8,085,508 B2 (HATCH M. R.) December 27, 2011; figures 4-5, 8; column 6, lines 60-65	1-2, 3/1-3/2, 13-14, 15/13-15/14, 25-26, 27/25-27/26
A	US 6,215,629 B1 (KANT R. et al.) April 10, 2001; entire document	1-2, 3/1-3/2, 13-14, 15/13-15/14, 25-26, 27/25-27/26
A	US 8,125,741 B2 (SHELOR J. R.) February 28, 2012; entire document	1-2, 3/1-3/2, 13-14, 15/13-15/14, 25-26, 27/25-27/26
A	US 8,310,790 B1 (FANSLAU JR. E. B.) November 13, 2012; entire document	1-2, 3/1-3/2, 13-14, 15/13-15/14, 25-26, 27/25-27/26
A	US 2006/0181812 A1 (KWON H. et al.) August 17, 2006; entire document	1-2, 3/1-3/2, 13-14, 15/13-15/14, 25-26, 27/25-27/26

☐ 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

19 February 2015 (19.02.2015)

Date of mailing of the international search report

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Shane Thomas

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INTERNATIONAL SEARCH REPORT

014/US2042 13.03.2013

International application No.

PCT/US14/52042

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.: 4-12, 16-24, 28
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:

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.