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(71) Applicant: **GLOBALWAFERS CO., LTD.** [CN/CN];
No. 8, Gongye E. 2nd Rd., East District, Hsinchu City,
30075 (TW).

(72) Inventors: **LUTER, William, L.**; 501 Pearl Drive, St.
Peters, Missouri 63376 (US). **BARGHOUTI, Bashar,
Ahmed**; 501 Pearl Drive, St. Peters, Missouri 63376 (US).
LI, Wei-Ru; No. 2 Creation Rd. 1, Hsinchu Science Park,
Hsinchu City, 30077 (TW). **LU, Zheng**; 501 Pearl Drive,
St. Peters, Missouri 63376 (US).

(74) Agent: **MUNSELL, Michael, G.** et al.; Armstrong Teas-
dale LLP, 7700 Forsyth Blvd., Suite 1800, St. Louis, Mis-
souri 63105 (US).

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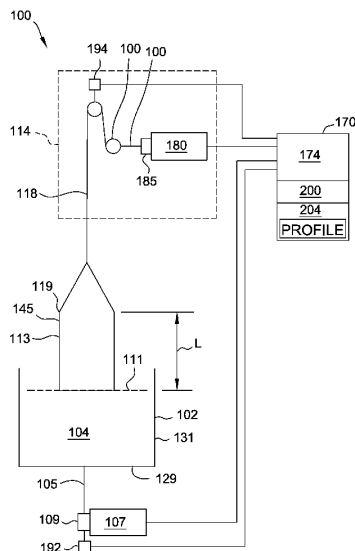


FIG. 1

(57) Abstract: A detection system includes a loadcell connected to a gear and motor of a crystal puller apparatus to measure force applied to the gear in a time domain. The data is analyzed through a Fourier transform to obtain data in the frequency domain. The frequency domain data includes an amplitude which corresponds to mechanical wear of the gear. The time domain data is compared against a threshold amplitude to determine if the gears have mechanical wear such that preventative maintenance can be performed on the motor.

WO 2023/183762 A1

[Continued on next page]

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