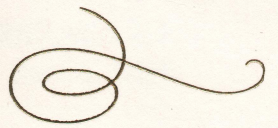
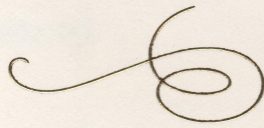


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The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Andrew Lauer

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE



(12) **United States Patent**
Wai

(10) **Patent No.:** **US 10,167,608 B1**
(45) **Date of Patent:** **Jan. 1, 2019**

(54) **APPARATUS FOR BI-DIRECTIONAL LOAD TESTING OF DRIVEN PILES AND INJECTION PILES, AND METHOD THEREOF**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/124,661**

(22) Filed: **Sep. 7, 2018**

Related U.S. Application Data

(62) Division of application No. 15/121,830, filed as application No. PCT/MY2015/000007 on Jan. 30, 2015.

Foreign Application Priority Data

Feb. 26, 2014 (MY) PI 2014000539
Jan. 30, 2015 (WO) PCT/MY2015/000007

(51) **Int. Cl.**
G01N 3/10 (2006.01)
E02D 33/00 (2006.01)
E02D 7/02 (2006.01)

(52) **U.S. Cl.**
CPC **E02D 33/00** (2013.01); **E02D 7/02** (2013.01); **G01N 3/10** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC E02D 33/00; E02D 1/022; E02D 7/02; E02D 2600/10; G01N 2203/0042; G01N 3/10
See application file for complete search history.

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(57) **ABSTRACT**

An apparatus for carrying out bi-directional load testing of close ended driven piles and injection piles utilizing a hydraulic jack, comprising an enclosure for housing the hydraulic jack. The apparatus includes a first hollow body, a second hollow body and a third hollow body. The first hollow body has an open upper end, an open lower end, and a base for attaching the top of the hydraulic jack. The second hollow body has an open upper end, an open lower end, and a base for attaching the base of the hydraulic jack. The third hollow body has an open upper end and an open lower end, and has an inner diameter corresponding to the outer diameter of the first hollow body and the second hollow body, the third hollow body being capable of being axially received by both the first hollow body and the second hollow body.

6 Claims, 10 Drawing Sheets

