



US009409553B2

(12) **United States Patent**
Nakamura et al.

(10) **Patent No.:** **US 9,409,553 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **CONTROL DEVICE FOR WORK VEHICLE**

B60T 13/686; B60T 13/168; B60T 7/04;
B60T 7/045-7/047; B60T 7/08; B60T 8/1701;
B60T 8/32; B60T 8/3255-8/326; B60T 8/50;
B60T 8/58-8/72; B60T 13/10; B60T 13/16;
B60T 13/66; F16D 55/24

(71) Applicant: **Hitachi Construction Machinery Co., Ltd.**, Bunkyo-ku, Tokyo (JP)

USPC 701/50, 48, 70; 303/121, 138, 157, 158,
303/167, 89

(72) Inventors: **Yuta Nakamura**, Tsuchiura (JP);
Katsuaki Kodaka, Tsuchiura (JP);
Masahiro Kayane, Tsuchiura (JP)

See application file for complete search history.

(73) Assignee: **Hitachi Construction Machinery Co., Ltd.**, Tokyo (JP)

(56) **References Cited**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 46 days.

U.S. PATENT DOCUMENTS

4,220,050 A * 9/1980 Friesen B60K 28/04
200/558
4,254,845 A * 3/1981 Braun B60T 1/08
180/244

(21) Appl. No.: **14/373,504**

(Continued)

(22) PCT Filed: **Jan. 18, 2013**

FOREIGN PATENT DOCUMENTS

(86) PCT No.: **PCT/JP2013/050974**

EP 2 208 630 A1 7/2010
JP 9-24807 A 1/1997

§ 371 (c)(1),
(2) Date: **Jul. 21, 2014**

(Continued)

(87) PCT Pub. No.: **WO2013/108888**

OTHER PUBLICATIONS

PCT Pub. Date: **Jul. 25, 2013**

International Search Report dated Feb. 26, 2013 with English translation (five (5) pages).

(65) **Prior Publication Data**

(Continued)

US 2015/0032337 A1 Jan. 29, 2015

(30) **Foreign Application Priority Data**

Primary Examiner — Bao Long T Nguyen

(74) Attorney, Agent, or Firm — Crowell & Moring LLP

Jan. 19, 2012 (JP) 2012-009248

(57) **ABSTRACT**

(51) **Int. Cl.**
B60T 7/04 (2006.01)
B60T 13/66 (2006.01)
(Continued)

A control device for work vehicle includes: a hydraulic brake device that generates a braking force according to operation of a brake pedal upon traveling; a brake lock device that hydraulically locks the hydraulic brake device and unlocks hydraulic lock of the hydraulic brake device; a brake pedal operation detection unit that detects the operation of the brake pedal; a hydraulic lock directing switch that is provided on a manual operating lever for operating a work device of the work vehicle; and a control unit that controls the brake lock device such that when the hydraulic lock directing switch is operated, the hydraulic brake device is hydraulically locked and when a predetermined depression operation of the brake pedal is detected by the brake pedal operation detection unit, the hydraulic lock of the hydraulic brake device is unlocked.

(52) **U.S. Cl.**
CPC . **B60T 7/045** (2013.01); **B60T 8/17** (2013.01);
B60T 8/326 (2013.01); **B60T 13/168** (2013.01);
(Continued)

3 Claims, 4 Drawing Sheets

(58) **Field of Classification Search**
CPC E02F 9/2253; E02F 9/226; E02F 9/2292;
E02F 9/2012; E02F 9/20-9/2004; E02F
9/2025; E02F 9/2029; E02F 9/2058; E02F
9/2083; E02F 9/22-9/2203; E02F 9/2246;
E02F 9/2278; B60T 8/17; B60T 13/662;

