(11) **EP 0 841 295 A3** 

(12)

## **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3: **12.01.2000 Bulletin 2000/02** 

(51) Int Cl.7: **B66C 13/06**, B66C 13/46

(43) Date of publication A2: 13.05.1998 Bulletin 1998/20

(21) Application number: 97308305.8

(22) Date of filing: 20.10.1997

(84) Designated Contracting States:

AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC

NL PT SE

(30) Priority: 07.11.1996 JP 29489896

(71) Applicant: Mitsubishi Heavy Industries, Ltd. Tokyo 100-0005 (JP)

(72) Inventors:

 Toyohara, Takashi, Mitsubishi Heavy Ind., Ltd. Hiroshima-shi, Hiroshima (JP)

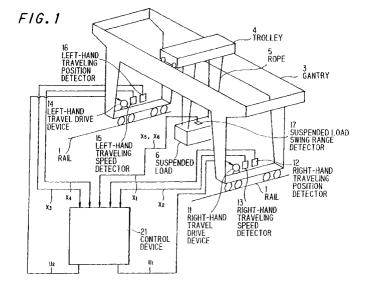
- Kouno, Susumu, Mitsubishi Heavy Ind., Ltd. Hiroshima-shi, Hiroshima (JP)
- Hoshina, Hiromitsu, Mitsubishi Heavy Ind., Ltd. Hiroshima-shi, Hiroshima (JP)
- (74) Representative:

Cross, Rupert Edward Blount et al BOULT WADE TENNANT, 27 Furnival Street London EC4A 1PQ (GB)

## (54) Suspended load steadying/positioning control device

(57) A suspended load steadying/positioning control device comprises independent drive devices 11, 14 for moving a crane 4 on two rails 1, the crane suspending a load by a rope 5 or the like and traveling on the rails 1 across them; position detectors 12, 15 for detecting the traveling position of the crane on each rail 1; speed detectors 13, 16 for detecting the traveling speed of the crane on each rail 1; a suspended load swing displacement detector 17; and an arithmetic means 21 for

calculating, based on inputs, operation commands for the drive devices 11, 14 at two locations, the inputs being the measured values of the traveling positions at two locations by the position detectors 12, 15, the measured values of the speeds at two locations by the speed detectors 13, 16, and the measured value of the displacement of the suspended load by the suspended load swing displacement detector 17. Thus, the suspended load can be accurately positioned even in a crane having a structural deformation.





## **EUROPEAN SEARCH REPORT**

Application Number EP 97 30 8305

| Category                                                                                                                                                                                                   | Citation of document with indication of relevant passage                                                                              |                                                                                                      | Relevant<br>to claim                                                                                                                                                                                                                                                          | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--|
| A                                                                                                                                                                                                          | WO 95 05336 A (CAILLAM<br>(FR); DEMOUSTIER VINCO<br>23 February 1995 (1999)<br>* page 7, line 22 - page 9, line 17 - 19<br>figure 4 * | RD ;EUDIER JEAN YVES<br>ENT (FR))<br>5-02-23)<br>age 8, line 2 *                                     | 1                                                                                                                                                                                                                                                                             | B66C13/06<br>B66C13/46                       |  |
| A                                                                                                                                                                                                          | EP 0 583 816 A (ANSALI<br>FINMECC) 23 February                                                                                        |                                                                                                      |                                                                                                                                                                                                                                                                               |                                              |  |
| A                                                                                                                                                                                                          | EP 0 677 478 A (SAMSUI<br>18 October 1995 (1995-                                                                                      |                                                                                                      |                                                                                                                                                                                                                                                                               |                                              |  |
|                                                                                                                                                                                                            |                                                                                                                                       |                                                                                                      |                                                                                                                                                                                                                                                                               | TECHNICAL FIELDS SEARCHED (Int.Cl.6)         |  |
|                                                                                                                                                                                                            |                                                                                                                                       |                                                                                                      |                                                                                                                                                                                                                                                                               |                                              |  |
|                                                                                                                                                                                                            |                                                                                                                                       |                                                                                                      |                                                                                                                                                                                                                                                                               |                                              |  |
|                                                                                                                                                                                                            |                                                                                                                                       |                                                                                                      |                                                                                                                                                                                                                                                                               |                                              |  |
|                                                                                                                                                                                                            | The present search report has bee                                                                                                     | n drawn up for all claims                                                                            | _                                                                                                                                                                                                                                                                             |                                              |  |
|                                                                                                                                                                                                            | Place of search                                                                                                                       | Date of completion of the search                                                                     | 1                                                                                                                                                                                                                                                                             | Examiner                                     |  |
| BERLIN                                                                                                                                                                                                     |                                                                                                                                       | 18 November 1999                                                                                     | 18 November 1999 T                                                                                                                                                                                                                                                            |                                              |  |
| CATEGORY OF CITED DOCUMENTS  X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure |                                                                                                                                       | T : theory or princip E : earlier patent d after the filling d D : document cited L : document cited | November 1999 Thomas, C  T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filling date D: document cited in the application L: document cited for other reasons  8: member of the same patent family, corresponding |                                              |  |

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 97 30 8305

This annex lists the patent family members relating to the patent documents cited in the above–mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-11-1999

|         | document<br>earch report | :               | Publication date |                                                    | Patent family<br>member(s)                                                                                         | Publication date                                                                                         |
|---------|--------------------------|-----------------|------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| WO 9505 | 5336                     | A               | 23-02-1995       | FR<br>AT<br>CA<br>DE<br>DE<br>EP<br>ES<br>GR<br>US | 2708920 A<br>148074 T<br>2169369 A<br>69401591 D<br>69401591 T<br>0713474 A<br>2100083 T<br>3023154 T<br>5878896 A | 17-02-19<br>15-02-19<br>23-02-19<br>06-03-19<br>10-07-19<br>29-05-19<br>01-06-19<br>30-07-19<br>09-03-19 |
| EP 058: | 3816                     | - <b></b>       | 23-02-1994       | IT<br>DE<br>JP                                     | 1255484 B<br>69313561 D<br>7133089 A                                                                               | 06-11-19<br>09-10-19<br>23-05-19                                                                         |
| EP 067  | 7478                     | Α               | 18-10-1995       | FI<br>JP<br>US<br>SG                               | 951461 A<br>8198584 A<br>5729453 A<br>44310 A                                                                      | 01-10-19<br>06-08-19<br>17-03-19<br>19-12-19                                                             |
|         |                          | . <del></del> - |                  |                                                    |                                                                                                                    |                                                                                                          |
|         |                          |                 |                  |                                                    |                                                                                                                    |                                                                                                          |
|         |                          |                 |                  |                                                    |                                                                                                                    |                                                                                                          |
|         |                          |                 |                  |                                                    |                                                                                                                    |                                                                                                          |
|         |                          |                 |                  |                                                    |                                                                                                                    |                                                                                                          |
|         |                          |                 |                  |                                                    |                                                                                                                    |                                                                                                          |
|         |                          |                 |                  |                                                    |                                                                                                                    |                                                                                                          |

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82