

(19) World Intellectual Property Organization
International Bureau



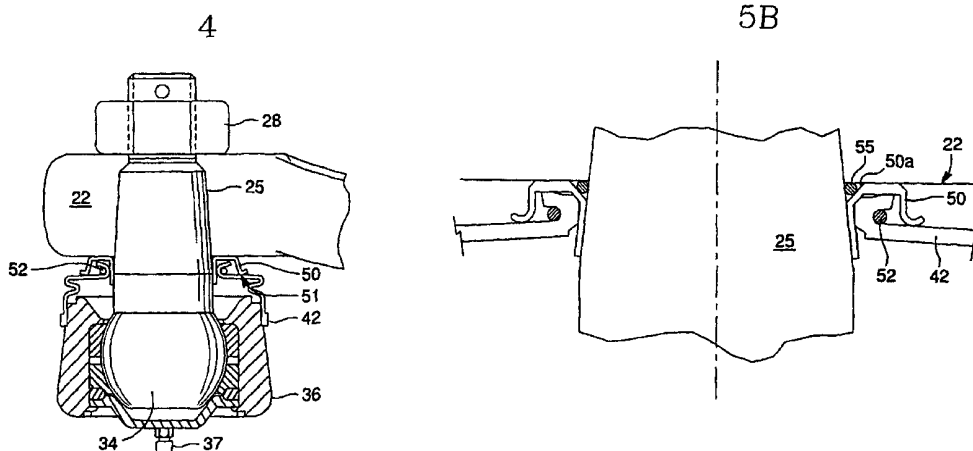
(43) International Publication Date
14 June 2001 (14.06.2001)

PCT

(10) International Publication Number
WO 01/42670 A3

- (51) International Patent Classification⁷: F16C 11/06
- (21) International Application Number: PCT/US00/42335
- (22) International Filing Date:
29 November 2000 (29.11.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
09/458,039 10 December 1999 (10.12.1999) US
- (71) Applicant: DANA CORPORATION [US/US]; P.O. Box 904, Toledo, OH 43697 (US).
- (72) Inventors: ZEBOLSKY, Michael, L.; 211 S. Marshall Street, Marshall, MI 49068 (US). DAVIS, Mark, A.; 7862 Primrose Lane, Portage, MI 49024 (US). MOSES, David, G.; 2090 E. 100 N., Decatur, IN 46733 (US).
- (74) Agent: STAVISH, Matthew, W.; Liniak, Berenato, Longacre & White, Suite 240, 6550 Rock Spring Drive, Bethesda, MD 20817 (US).
- (81) Designated States (national): AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
3 January 2002
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: BOOT SEAL FOR BALL JOINTS



(57) Abstract: The ball joint has a socket body and a ball stud pivotally mounted to the socket body. The ball stud has a shank portion that extends therefrom and is aligned along a shank axis. An elastic boot seal (42) that extends between the ball stud and socket body is also included. The seal element (50) is interposed between the boot seal, the shank portion and the input/output member (18) to enhance the boot seal interface and thereby guard the boot seal to shank portion interface against contamination during movement and articulation of the input/output member relative to the ball joint.

WO 01/42670 A3



INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 00/42335

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F16C11/06

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 7 F16C B62D B60G

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 028 126 A (FORD MOTOR CO) 4 May 1966 (1966-05-04)	1-4, 18, 19
Y	the whole document	10, 12-14
X	FR 1 538 231 A (A. EHRENREICH & CIE) 30 August 1998 (1998-08-30)	1-6
A	page 2, right column	18, 19
P, X	WO 00 55514 A (BROEKER KLAUS ; ABELS OLAF (DE); ZF LEMFOERDER METALLWAREN AG (DE)) 21 September 2000 (2000-09-21) page 6, line 5-17; figures 5-7	1-4, 18, 19
A	FR 836 608 A (CHICAGO RAWHIDE MANUFACTURING CY) 23 January 1939 (1939-01-23) the whole document	1, 18
	-/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° 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 document 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

14 June 2001

Date of mailing of the international search report

21.06.2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

BEGUIN, C

INTERNATIONAL SEARCH REPORT

International Application No PCT/US 00/42335
--

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 028 163 A (KRIEG MICHAEL ET AL) 2 July 1991 (1991-07-02) column 3, line 48-52 column 4, line 39-45; figure 1 -----	10,12-14
A	US 3 290 073 A (R. GOTTSCHALD) 6 December 1966 (1966-12-06) -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/42335

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

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 an additional fee, this Authority did not invite payment of any additional fee.
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.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-9,18-20

bearing sealing ring for the extremity of a boot seal for ball joint

2. Claims: 10-17

static sealing means for the stud of a ball joint

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/US 00/42335

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 1028126	A	04-05-1966	NONE	
FR 1538231	A		NONE	
WO 0055514	A	21-09-2000	DE 19911770 A BR 0005391 A EP 1080312 A	26-10-2000 30-01-2001 07-03-2001
FR 836608	A	23-01-1939	NONE	
US 5028163	A	02-07-1991	DE 3833409 A CA 1312897 A DE 58903654 D EP 0362566 A JP 2133289 A JP 2714453 B	05-04-1990 19-01-1993 08-04-1993 11-04-1990 22-05-1990 16-02-1998
US 3290073	A	06-12-1966	NONE	