



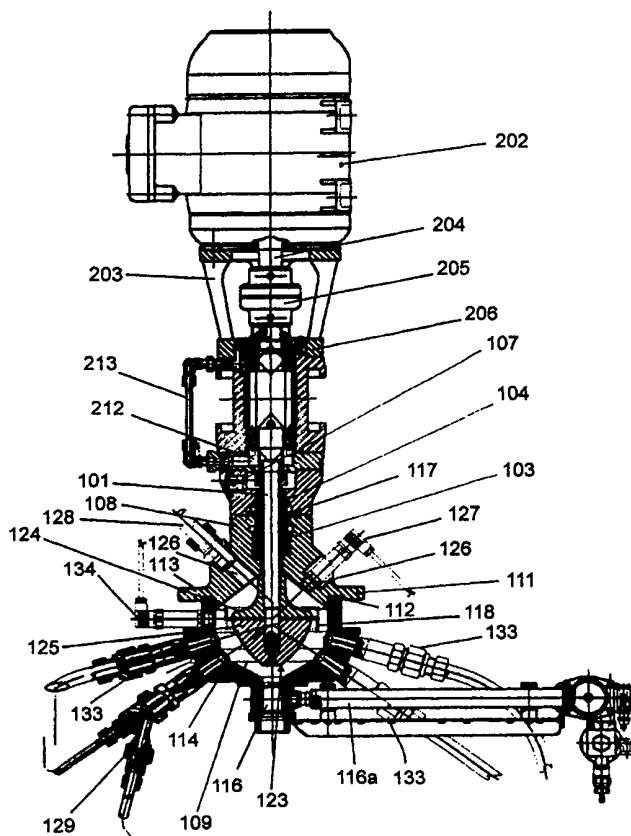
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : B01F 13/10, B29B 7/40, B01F 15/00, G05D 16/06	A3	(11) International Publication Number: WO 00/03578 (43) International Publication Date: 27 January 2000 (27.01.00)
(21) International Application Number: PCT/BR98/00048 (22) International Filing Date: 16 July 1998 (16.07.98) (71) Applicant (for all designated States except US): RENNER HERRMANN S.A. [BR/BR]; Avenida Assis Brasil, 3966, CEP-91010-003 Porto Alegre, RS (BR). (72) Inventor; and (75) Inventor/Applicant (for US only): BATISTA AUAD, Rogério [BR/BR]; Apartamento 408, Rua Visconde de Pelotas, 155, CEP-91030-530 Porto Alegre, RS (BR). (74) Agent: DANNEMANN, SIEMSEN, BIGLER & IPANEMA MOREIRA; Caixa Postal 2142, CEP-20001-970 Rio de Janeiro, RJ (BR).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, 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, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, 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), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 20 April 2000 (20.04.00)

(54) Title: FLUID MIXING DEVICE AND FLUID INJECTION VALVE FOR USE THEREWITH

(57) Abstract

A fluid mixing device (1), for the continuous mixing of two or more fluids, having a mixing chamber which has fluid contact surfaces (110, 115, 123a) defining an internal chamber region (109), a fluid inlet (132), for feeding fluid into the chamber region (109), a fluid outlet (130), for feeding fluid out of the chamber region (109), and a fluid mixer (118) within the chamber region (109) which is capable of inducing mixing of two or more fluids within a mixing region. The mixing chamber is configured so that the dead volume within the chamber region (109) is filled in such a way that the mixing region corresponds to the chamber region (109). A fluid inlet valve for use in the fluid mixing device has entrance and exit aperture sealing means (162, 142) which are adapted to allow passage of fluid respectively into and out of a body portion (135, 158) of the valve, according to a specified pressure differential between the pressure externally of the entrance aperture (159) and the pressure externally of the exit aperture (136).



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INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/BR 98/00048

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01F13/10 B29B7/40 B01F15/00 G05D16/06

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 B29B B29C B01F G05D F16K

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 213 712 A (AANONSEN BENT ET AL) 22 July 1980 (1980-07-22) abstract; claims 1,16; figures 1,3 column 1, line 33 -column 1, line 38 column 3, line 45 -column 4, line 2 ---	1-4
X	WO 94 11096 A (EASTMAN KODAK CO) 26 May 1994 (1994-05-26) abstract; claims 1-3,8; figure 1 page 1, line 28 -page 2, line 17 page 5, line 11 -page 5, line 28 ---	1,2
A	GB 2 248 406 A (FILLWORTH LIMITED) 8 April 1992 (1992-04-08) abstract; claims 1,2; figures 1,2 page 3, line 3 -page 3, line 11 --- -/--	1,2

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

9 February 2000

Date of mailing of the international search report

21. 02. 2000

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/BR 98/00048

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 734 761 A (KODAK LTD ;EASTMAN KODAK CO (US)) 2 October 1996 (1996-10-02) abstract; claim 1; figure 1 column 3, line 11 -column 3, line 20 column 7, line 2 -column 7, line 9 -----	1,2,4
A	GB 1 266 511 A (ANDERSON , GREENWOOD & CO.) 8 March 1972 (1972-03-08) page 2, line 55 -page 5, line 21 figures 2-4 -----	9
A	US 5 174 327 A (TRUAX PERIN E ET AL) 29 December 1992 (1992-12-29) the whole document -----	9
A	GB 197 159 A (J. G. STEWART) 4 January 1923 (1923-01-04) the whole document -----	9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR 98/ 00048

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.
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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: 1-8
claims 1-8 which concern a mixing device, for mixing two or more fluids, comprising an inner core having a fluid contact surface, which core occupies the dead volume in the mixing region.
2. Claim: 9
claim which concerns a valve means comprising features which improve the accuracy of material dosing into a container.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/BR 98/00048

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