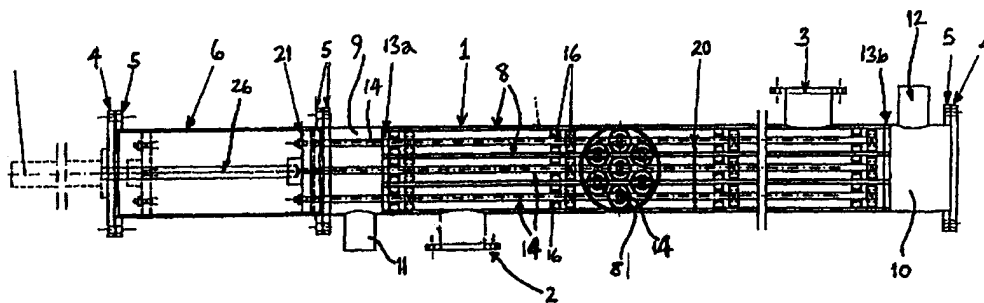




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/EP99/05077 <b>(22) International Filing Date:</b> 16 July 1999 (16.07.99)  <b>(30) Priority Data:</b> P 9801521                      16 July 1998 (16.07.98)                      ES  <b>(71) Applicant (for all designated States except US):</b> HRS SPIRATUBE S.L. [ES/ES]; C/Jaime 1, no.1, 3° Centro, E-30008 Murcia (ES).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> PAGAN DURAN, Jesus [ES/ES]; HRS Spiratube S.L., C/Jaime 1, no. 1, 3° Centro, E-30008 Murcia (ES).  <b>(74) Agents:</b> KINSLER, Maureen et al.; Kilburn & Strode, 20 Red Lion Street, London WC1R 4PJ (GB).		<b>(81) Designated States:</b> 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, SL, 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).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** IMPROVEMENTS TO HEAT EXCHANGERS**(57) Abstract**

A heat exchanger assembly comprises a tubular casing (1) housing product conduit pipes (8) and a rod (14) extending through each pipe (8). The rod (14) being reciprocatingly moveable along the pipe (8) and having a scraping means (15) projecting from it such that upon reciprocation of the rod (14) within the pipe (8) the scraping means (15) will scrape product residues from the inner walls of the product conduit (8), allowing improved heat transfer to be achieved whilst the assembly continues to operate.

# INTERNATIONAL SEARCH REPORT

Inter- national Application No  
PCT/EP 99/05077

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F28G1/08 F28G1/10 F28F19/00

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 F28G F28F

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	EP 0 730 893 A (WATERWORKS INTERNATIONAL INC) 11 September 1996 (1996-09-11) column 7, line 21 -column 8, line 38; figures ---	1-10, 14-17, 19
X	US 5 311 929 A (VERRET NORMAND) 17 May 1994 (1994-05-17)  column 4, line 20 - line 23; claim 1; figures ---	1-5, 8-10, 12, 14-16, 19-21
X	DE 296 10 899 U (TAPROGGE GMBH) 23 October 1997 (1997-10-23) page 18, line 30 -page 21, line 9; claim 1; figures 6-11 --- -/--	1, 4-9, 11-16, 19

☒ 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

28 October 1999

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## INTERNATIONAL SEARCH REPORT

Inter- national Application No

PCT/EP 99/05077

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 718 480 A (KITO MASAHIRO ET AL) 12 January 1988 (1988-01-12)  column 3, line 55 -column 4, line 33; figures -----	1-5, 9-11, 14-16, 18-22
X	US 4 330 032 A (KOPPELMAN EDWARD ET AL) 18 May 1982 (1982-05-18) abstract column 5, line 33 - line 40; figures -----	1,9,15, 16,18,19
X	US 3 384 161 A (MALMSTROM LENNART HUGO ET AL) 21 May 1968 (1968-05-21) column 2, line 38 - line 52; figures -----	1-4,6, 9-16,19
X	DE 296 188 C (KNORR-BREMSE AG) 19 January 1907 (1907-01-19)  the whole document -----	1,4,5,9, 11,13, 16,19
A	US 3 973 623 A (SARLL PETER GEOFFREY) 10 August 1976 (1976-08-10) claim 2; figures -----	4-7, 11-13