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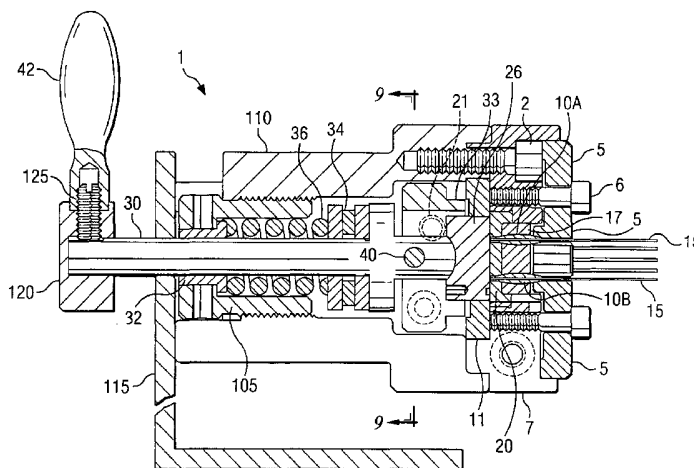
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[Continued on next page]

(54) Title: IMPROVED METHODS AND APPARATUS FOR MICRO-FLUIDIC ANALYTICAL CHEMISTRY



(57) Abstract: Improved valve and methods for analytical techniques and systems. The valve includes a main housing, together with a rotor and stator. The stator has openings therethrough which allow for fluid communication between tubing when connected to the valve, and one surface of the rotor. Ferrules can be used with a clamping assembly to tightly connect the tubing to the valve in a way which separates the clamp assemblies (for ease of connection and disassembly), yet still provides close proximity between the fluid connections. In one embodiment, a series of two or more discrete elements, which can be selectively moved relative to one another, are located within the valve in a "stacked" configuration. Each of the discrete elements includes at least one feature useful for performing chemical analysis, such as sample loops, columns, detectors, mixers and the like, all of which are useful in chromatography.



SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations* AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations* AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID,

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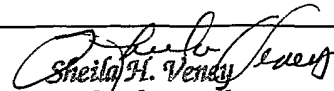
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : F16K 17/00 US CL : 137/625.47; 73/23.42, 61.56, 61.59, 864.83 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) U.S. : 137/625.47; 73/23.42, 61.56, 61.59, 864.83 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,583,281 A (YU) 10 December 1996 (10.12.1996), See the entire document.	1-20
A	US 5,575,929 A (YU et al.) 19 November 1996 (19.11.1996), See the entire document.	1-20
A	US 4,444,066 A (OGLE et al.) 24 April 1984 (24.04.1984), See the entire document.	1-20
A	US 4,756,201 A (UFFENHEIMER) 12 July 1988 (12.07.1988), See the entire document.	1-20
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
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