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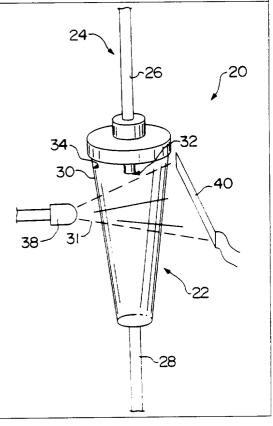
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(54) Title: DROP DETECTION METHOD AND APPARATUS

(57) Abstract

A drop detector system and method are provided for a drop detector of the type including a drop chamber (30) and an electro-optical sensor (40). The detector system detects drops passing through an optical sensing path between a detector (40) and at least one light source (38). In response to the detection of a drop passing through the optical path, the detector produces an output signal. A capacitator is connected between the detector and an amplifier to block the DC component of the output signal. After amplification, the signal is passed through a low pass filter to further block signals caused by undesirable factors. The cutoff frequency of the low pass filter is controlled by a microprocessor that controls the pump that pumps liquid from the drop chamber. The detector and light source or sources are arranged to detect drops falling in the drop chamber at virtually any angle and in virtually any ambient light condition.



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⁺ Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

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		Documentation Searched other that to the Extent that such Documents are	n Minimum Documentation Included in the Fields Searched ⁶	
III. DOCUME	NTS CONSIDER	ED TO BE RELEVANT	attaches arrange 12	Relevant to Claim No.13
Category °	Citation of D	ocument, 11 with indication, where appropriate	e, of the relevant passages	
X	WO,A,8 see pag	603 597 (BAXTER TRAVENOL e 3, line 17 - line 20;	.) 19 June 1986 figure 1	1-6,24
x	EP,A,O	170 984 (ABBOTT LABS) 12	Prebruary 1986	1,7,8, 12,25
	see pag	ge 4, line 17 - page 5, l	line 7; figures	
x	IIS A 4	533 350 (DANBY ET AL) 6 stract; figure 3	August 1985	1,8,9,25
x	EP,A,O	229 354 (ABBOTT LABS) 23	2 July 1987	1,8,10, 12,25
x		stract; figure 6 209 659 (INTERMEDICAT G	MBH) 28 January	1,7,8
	1987 see co	lumn 4, line 53 - column		11,12,25
	figure	s	-/	
"A" doct	sidered to be or par- ier document but p ng date ument which may t ch is cited to establ tion or other specia ument referring to	general state of the art which is not ticular relevance ublished on or after the international brow doubts on priority claim(s) or ish the publication date of another if reason (as specified) an oral disclosure, use, exhibition or it to the international filling date but	"T" later document published after the into or priority date and not in conflict wit cited to understand the principle or the invention of the cannot be considered novel or cannot involve an inventive step "Y" document of particular relevance; the cannot be considered to involve an indecument is combined with one or ments, such combination being obvious in the art. "A" document member of the same patent	cizimed invention be considered to cizimed invention be considered to cizimed invention wentive step when the pre other such docu- us to a person skilled
IV. CERTI	FICATION		Date of Mailing of this International	Search Report
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	al Searching Author	rity PEAN PATENT OFFICE	Signature of Authorized Officer CLARKSON P.	Affe

	NTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)	
	NTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET) Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
ategory °	Citation of Document, with the state of the	
	WO,A,8 603 002 (BAXTER TRAVENOL) 22 May 1986 see page 5, line 7 - page 6, line 28; figures	1 22
(see page 5 line 7 - page 6, line 28; figures	15-23,
	see page 3, Time / P-3/	26,27
	1077	15-23,
Y	US,A,4 058 699 (VAN VLOTEN) 15 November 1977	26,27
	see abstract; figures 3,4	
	see abstract, righter of	
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. US 9202435 59559

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international 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. 18/08/92.

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A-8603597	19-06-86	US-A- CA-A- EP-A,B JP-T- US-A-	4680462 1243746 0205561 62501167 4786800	14-07-87 25-10-88 30-12-86 07-05-87 22-11-88
EP-A-0170984	12-02-86	AU-A- JP-A- US-A-	4536685 61047537 4720636	13-02-86 08-03-86 19-01-88
US-A-4533350	06-08-85	CA-A-	1252682	18-04-89
EP-A-0229354	22-07-87	US-A- AU-B- AU-A- CA-A- DE-A- JP-A-	4718896 609381 6719887 1271541 3680654 62170258	12-01-88 02-05-91 16-07-87 10-07-90 05-09-91 27-07-87
EP-A-0209659	28-01-87	DE-A- JP-A-	3525264 62019180	22-01-87 27-01-87
WO-A-8603002	22-05-86	US-A- CA-A- EP-A,B JP-T-	4673820 1245741 0198909 62500738	16-06-87 29-11-88 29-10-86 26-03-87
US-A-4058699	15-11-77	None	·	