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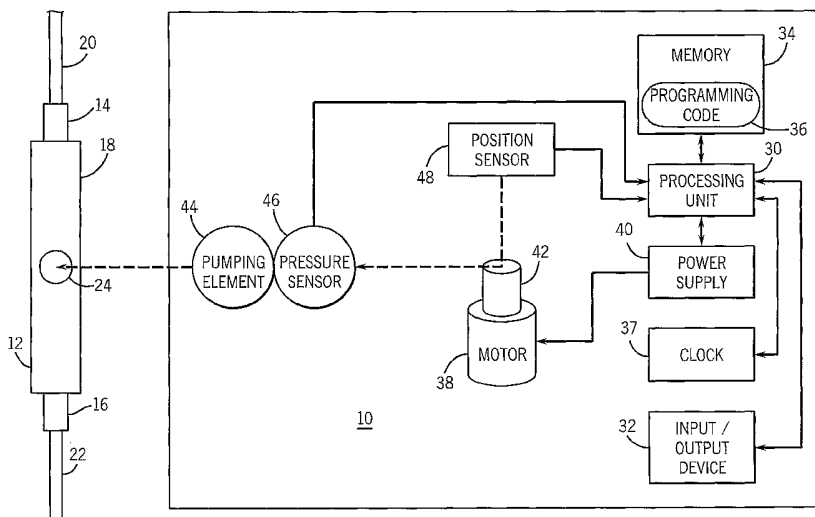
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(54) Title: MEDICAL INFUSION PUMP WITH CLOSED LOOP STROKE FEEDBACK SYSTEM AND METHOD



(57) Abstract: A medical pump (10) with a closed loop stroke feedback system and method, for use with a pumping chamber (24), for example in a cassette (12), is disclosed. The pump includes a pumping element (44) that intermittently pressurizes a pumping chamber during a pumping cycle. A pressure sensor (46) detects the pressure exerted by the pumping element on the pumping chamber. A position sensor (48) detects the position of the pumping element. A processing unit (30) processes pressure data from the pressure sensor and position data from the position sensor to determine a calculated stroke volume of the pump for a pump cycle, and to adjust a stroke frequency of the pump to compensate for variation in the stroke volume.

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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 A61M5/142 A61M5/168 A61M5/172		
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 A61M		
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	US 2003/055375 A1 (HOLST PETER A ET AL) 20 March 2003 (2003-03-20) paragraphs [0017], [0046]; figures 1-2c -----	1-12, 23-25
X	EP 0 282 323 A (CRITIKON, INC; FRESENIUS AG) 14 September 1988 (1988-09-14) column 3, line 60 - column 4, line 39; figures 1,2,6,7 -----	1-12, 23-25
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> 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	"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	
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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 <div style="text-align: center; font-size: 1.2em;">Ceccarelli, D</div>	

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 02/087664 A (ABBOTT LABORATORIES) 7 November 2002 (2002-11-07) the whole document -----	1-12, 23-25
A	EP 0 291 727 A (ABBOTT LABORATORIES) 23 November 1988 (1988-11-23) the whole document -----	2-6
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P,X	US 2004/120825 A1 (BOUON CHAD E ET AL) 24 June 2004 (2004-06-24) the whole document -----	1-12, 23-25
P,X	US 2004/247445 A1 (NELSON STEVEN R ET AL) 9 December 2004 (2004-12-09) the whole document -----	1-12, 23-25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2005/010010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/010010

Box II Observations where certain claims were found unsearchable (Continuation of item 2 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.: 13-22
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy. Adjusting a flow rate of an infusion pump is decisive for the success of a therapy.
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 III Observations where unity of invention is lacking (Continuation of item 3 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.:
1-12, 23-25

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: 1-12,23-25

Medical pump for use with a cassette, with a pumping element, a pressure sensor, a position sensor, a processing unit and a memory with a program for adjusting the stroke frequency of the pumping element based on readings of the sensors.

2. claims: 26-30

Medical pump for use with a cassette, with a processing unit and a memory with a program for obtaining a specific delivery profile.
