



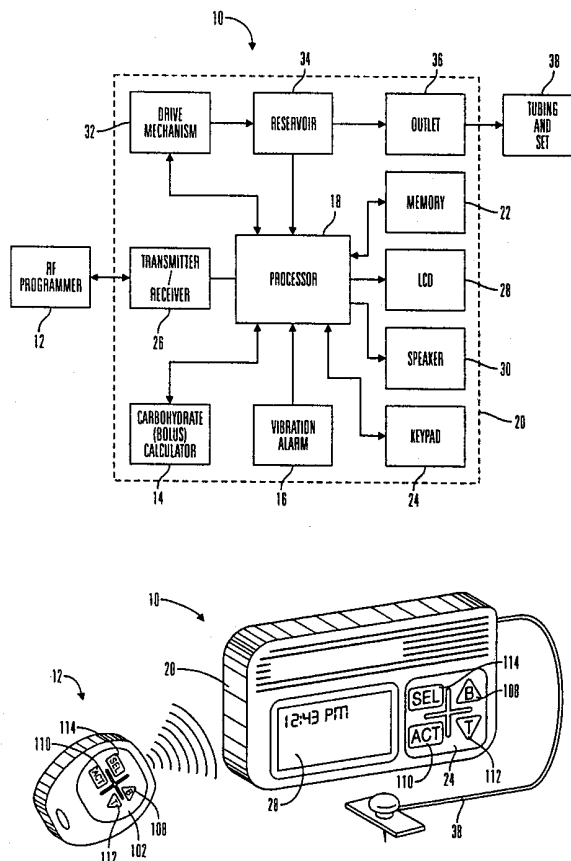
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60/096,994 18 August 1998 (18.08.98) US			
09/334,858 16 June 1999 (16.06.99) US			
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(54) Title: EXTERNAL INFUSION DEVICE WITH REMOTE PROGRAMMING, BOLUS ESTIMATOR AND/OR VIBRATION ALARM CAPABILITIES

(57) Abstract

An infusion system for infusing a liquid into a body includes an external infusion device and a remote commander. The external infusion device includes a housing, a receiver, a processor and an indication device. The receiver is coupled to the housing and for receiving remotely generated commands. The processor is coupled to the housing and the receiver to receive remotely generated commands and to control the external infusion device in accordance with the commands. The indication device indicates when a command has been received and indicates when the command is being utilized to control the external infusion device so that the external infusion device is capable of being concealed from view when being remotely commanded. The remote commander includes a commander housing, a keypad for transmitting commands, and a transmitter for transmitting commands to the receiver of the external infusion device.



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INTERNATIONAL SEARCH REPORT

In: itional Application No

PCT/US 99/18977

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M5/172 A61M5/36

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 494 950 A (FISCHELL ROBERT E) 22 January 1985 (1985-01-22) column 3, line 55 - line 66 column 4, line 20 - line 22 column 5, line 42 - line 56 column 7, line 16 - line 28 figures	1
Y	---	2,3,11, 14-20, 24,25,53
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search

27 March 2000

Date of mailing of the international search report

06.04.2000

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INTERNATIONAL SEARCH REPORT

Int. Patent Application No.

PCT/US 99/18977

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 368 562 A (BLOMQUIST MICHAEL L ET AL) 29 November 1994 (1994-11-29) column 7, line 53 - line 65 column 8, line 30 column 8, line 34 - line 58 figures 1,4	2,3,11, 14-20, 24,25,53
A	---	23
A	WO 97 21456 A (UNIV MELBOURNE ;CRANKSHAW DAVID PILKINGTON (AU)) 19 June 1997 (1997-06-19) page 11, line 6 - line 8 page 11, line 30 -page 12, line 2 abstract; claims 4,6	2,7-10, 21,22, 31,34,53
A	---	
A	US 5 569 187 A (KAISER ULRICH) 29 October 1996 (1996-10-29) column 3, line 52 -column 4, line 6 figure 2	1,11,53
A	---	
A	US 5 582 593 A (HULTMAN BARRY W) 10 December 1996 (1996-12-10) figure 6 column 13, line 18 - line 58	2
A	---	
A	US 4 871 351 A (FEINGOLD VLADIMIR) 3 October 1989 (1989-10-03) column 2, line 49 - line 56 column 3, line 54 - line 62 column 8, line 37 - line 42	2
A	---	
A	US 4 731 051 A (FISCHELL ROBERT E) 15 March 1988 (1988-03-15) column 4, line 5 - line 15 column 4, line 34 - line 42 column 15, line 11 - line 18	3-6, 28-30
A	---	
A	US 4 395 259 A (PRESTELE KARL ET AL) 26 July 1983 (1983-07-26) figure 3	11,12
X	---	
X	EP 0 806 738 A (SOC ET TECH S E T) 12 November 1997 (1997-11-12) column 1, line 3 - line 8 column 1, line 37 - line 51 column 2, line 50 -column 3, line 3 column 7, line 29 -column 8, line 6 figures	35-37, 52,54,55
Y	---	
X	DE 43 29 229 A (MEDITECH MEDIZINTECHNIK GMBH) 9 March 1995 (1995-03-09) column 3, line 25 - line 26 claims 1,6	38-40,53
	---	51

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INTERNATIONAL SEARCH REPORT

Int. l. Application No

PCT/US 99/18977

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 826 810 A (AOKI THOMAS T) 2 May 1989 (1989-05-02) column 2, line 17 - line 21 column 6, line 58 - line 63 figure 1	38-40
A	----	43
Y	US 4 270 532 A (FRANETZKI MANFRED ET AL) 2 June 1981 (1981-06-02) column 3, line 63 - line 67; figure 1 ----	53
A	US 5 764 159 A (NEFTEL FREDERIC) 9 June 1998 (1998-06-09) column 3, line 58 - line 60 ----	44,47
A	US 4 373 527 A (FISCHELL ROBERT E) 15 February 1983 (1983-02-15) column 12, line 58 -column 13, line 12 figures 7,8 ----	35,41,42
A	US 3 631 847 A (HOBBS JAMES C) 4 January 1972 (1972-01-04) column 7, line 4 - line 10 -----	44

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/18977

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.
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.:

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: 1-10; 11-34; 53

external infusion device having

A) claims 1-10:

- housing,
- receiver (purpose: hiding under e.g. clothes possible due to remotely generated signals)
- processor coupled to the housing,
- indication device;

B) claims 11-34:

same features as A) plus

- remote commander with a housing, keypad and transmitter (purpose: controlling of external infusion device while hiding the same under e.g. clothes);

C) same features as A) plus

- memory;

2. Claims: 35-43

external infusion device having

- housing
- processor coupled to the housing,
- bolus estimator (purpose: defining proper bolus amount);
- indication device to indicate when an amount of fluid to be infused has been calculated;

3. Claims: 44-46; 47-50

external infusion device having

- housing with reservoir,
- processor coupled to the housing,
- alarm (purpose critical condition warning and, in the case of vibration alarm (claim 44), removing of gas bubbles);

4. Claims: 51; 52; 54,55

external infusion device having

- housing,
- processor coupled to the housing,
- keypad coupled to the housing (purpose: direct programming of external infusion device on the housing of the device),
- indication device to indicate the selected bolus type.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/18977

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4494950	A	22-01-1985	NONE	
US 5368562	A	29-11-1994	NONE	
WO 9721456	A	19-06-1997	AU 1064597 A	03-07-1997
US 5569187	A	29-10-1996	NONE	
US 5582593	A	10-12-1996	CA 2154390 A	22-01-1996
US 4871351	A	03-10-1989	CA 1254091 A EP 0183351 A JP 61222457 A	16-05-1989 04-06-1986 02-10-1986
US 4731051	A	15-03-1988	US 4373527 A CA 1207871 A DE 3390462 C DE 3390462 T EP 0137789 A GB 2146460 A,B IT 1219342 B JP 6059315 B JP 60501293 T WO 8403218 A DE 3247232 A FR 2537873 A GB 2132090 A,B GB 2174218 A,B US 4573994 A US 4525165 A US 4619653 A	15-02-1983 15-07-1986 29-07-1993 24-01-1985 24-04-1985 17-04-1985 03-05-1990 10-08-1994 15-08-1985 30-08-1984 05-07-1984 22-06-1984 04-07-1984 29-10-1986 04-03-1986 25-06-1985 28-10-1986
US 4395259	A	26-07-1983	DE 3035670 A EP 0048423 A JP 1383678 C JP 57084062 A JP 61050460 B	29-04-1982 31-03-1982 09-06-1987 26-05-1982 04-11-1986
EP 0806738	A	12-11-1997	FR 2748588 A	14-11-1997
DE 4329229	A	09-03-1995	NONE	
US 4826810	A	02-05-1989	AT 73344 T AU 588794 B AU 3746685 A CA 1283206 A DE 3485580 A EP 0165973 A JP 5068267 B JP 61500710 T WO 8502544 A	15-03-1992 28-09-1989 26-06-1985 16-04-1991 16-04-1992 02-01-1986 28-09-1993 17-04-1986 20-06-1985
US 4270532	A	02-06-1981	DE 2758368 A EP 0002775 A JP 54096283 A JP 61027063 B	05-07-1979 11-07-1979 30-07-1979 24-06-1986
US 5764159	A	09-06-1998	FR 2716286 A	18-08-1995

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/18977

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5764159 A		AU 691258 B	14-05-1998
		AU 1815195 A	04-09-1995
		CA 2182722 A	24-08-1995
		DE 69502936 D	16-07-1998
		DE 69502936 T	08-10-1998
		EP 0744974 A	04-12-1996
		WO 9522363 A	24-08-1995
		JP 9510054 T	07-10-1997
US 4373527 A	15-02-1983	DE 3247232 A	05-07-1984
		FR 2537873 A	22-06-1984
		GB 2132090 A,B	04-07-1984
		GB 2174218 A,B	29-10-1986
		US 4573994 A	04-03-1986
		US 4525165 A	25-06-1985
		US 4619653 A	28-10-1986
		US 4731051 A	15-03-1988
US 3631847 A	04-01-1972	NONE	