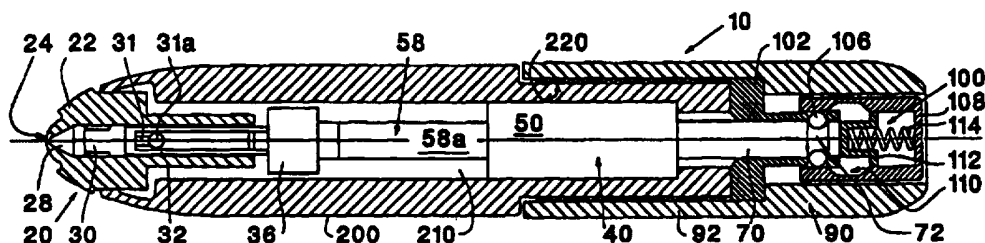




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>6</sup> : <b>A61M 5/30, A61J 1/00</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 96/21482</b></p> <p>(43) International Publication Date: 18 July 1996 (18.07.96)</p>
<p>(21) International Application Number: PCT/US96/00086</p> <p>(22) International Filing Date: 11 January 1996 (11.01.96)</p> <p>(30) Priority Data: 369,812 9 January 1995 (09.01.95) US</p> <p>(71) Applicant (for all designated States except US): MEDI-JECT CORPORATION [US/US]; 1840 Berkshire Lane, Minneapolis, MN 55441 (US).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): LILLEY, Stephen, J. [GB/GB]; 1 Granta Road, Sawston CB2 4HT (GB). TAYLOR, Hugh, F. [GB/GB]; 17 Park Road, Sawston CB2 4TA (GB). THEOBALD, David, R. [GB/GB]; 4 Canberra Drive, St. Ives, Huntingdon PE17 6UR (GB). CARLSON, Craig, J. [US/US]; 9 Stevens Circle, Andover, MA 01810 (US). ROSEN, David, I. [US/US]; 88 College Avenue, Arlington, MA 02174 (US). JOHNSON, Thomas, R. [US/US]; 16 Clark Road, Milford, NH 03055 (US).</p> <p>(74) Agent: FANUCCI, Allan, A.; Pennie &amp; Edmonds, 1155 Avenue of the Americas, New York, NY 10036 (US).</p>		<p>(81) Designated States: AL, AM, AU, AZ, BB, BG, BR, BY, CA, CN, CZ, EE, FI, GE, HU, IS, JP, KG, KP, KR, KZ, LK, LR, LS, LT, LV, MD, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TJ, TM, TR, TT, UA, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AZ, BY, KZ, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 12 September 1996 (12.09.96)</p>

(54) Title: MEDICAL INJECTION SYSTEM COMPRISING A GAS SPRING



## (57) Abstract

A needleless injection system and method for injecting a medical product comprises a needleless injection device having a nozzle assembly defining an ampule chamber for holding medication, an energy device for pushing medication out of the nozzle assembly, and an energy device actuating mechanism. These components are operatively contained in a housing configured for a hand-held operation. The energy device is a self-contained gas spring operatively connected to a plunger operating within the ampule chamber. The gas spring is preferably stepped which can be used in many different applications, an air gun being one. The injection device can be provided with a coupling device for coupling a medication supply vial to the nozzle assembly. The nozzle assembly is removably situated in the housing with the plunger removable therewith.

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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 96/00086

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A61M5/30 A61J1/00

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 6 A61M A61J

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,A,4 561 856 (COCHRAN) 31 December 1985 see column 2, line 60 - column 3, line 9 see column 5, line 18 - line 26 see figures 1-4	1
Y	---	9,10
Y	WO,A,90 01961 (INJET MEDICAL PRODUCTS) 8 March 1990 see page 26, line 3 - page 28, line 33 see figures 13,13A	9,10
Y	---	1,2
Y	US,A,5 062 830 (DUNLAP) 5 November 1991 cited in the application see column 3, line 31 - column 6, line 12 see figures 2,3	1,2
A	---	3-7
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

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- \*O\* document referring to an oral disclosure, use, exhibition or other means
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- \*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
- \*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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- \*&\* document member of the same patent family

Date of the actual completion of the international search

29 July 1996

Date of mailing of the international search report

05.08.96

Name and mailing address of the ISA

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Authorized officer

Schönleben, J

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 96/00086

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE,C,41 29 271 (FRESENIUS AG) 17 September 1992 see column 2, line 7 - column 3, line 13 see figure 6  ---	1,2
A	US,A,5 193 517 (TAYLOR ET AL.) 16 March 1993 cited in the application see figures 3-5  ---	3
A	DE,A,22 54 153 (KULLMANN) 9 May 1974 see page 4, line 1 - page 5, line 2 see page 9, line 9 - line 13 see figure 9  ---	1
A	US,A,4 507 113 (DUNLAP) 26 March 1985 cited in the application see column 3, line 63 - column 5, line 65 see figures 1-3  ---	10
A	US,A,5 279 576 (LOO ET AL.) 18 January 1994 see column 3, line 59 - column 4, line 11 see figures 7,11  ---	11
A	EP,A,0 499 481 (WAVERLEY PHARMACEUTICAL LIMITED) 19 August 1992 see column 8, line 8 - column 9, line 25 see figure 2  -----	9

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 96/00086

**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:

1. Claims: Claims 1, 2 to 8      Medical injection system comprising a gas spring and a trigger mechanism
2. Claims: Claims 1,9 to 11      Medical injection comprising a gas spring and a coupling device

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.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/00086

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