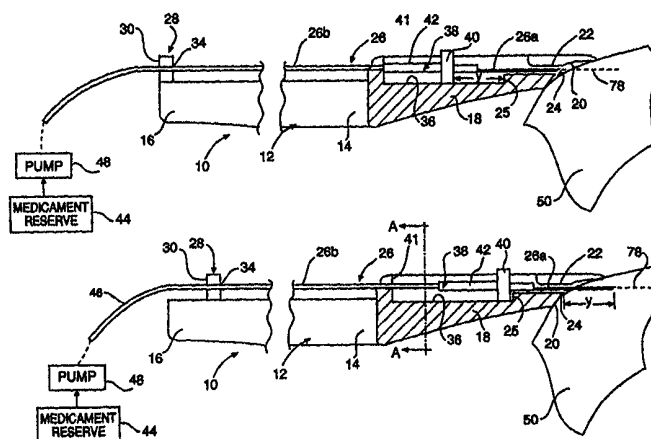


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>7</sup> : <b>A61F 9/007, A61M 5/46, 25/04</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 00/07530</b></p> <p>(43) International Publication Date: 17 February 2000 (17.02.00)</p>
<p>(21) International Application Number: PCT/US99/17381</p> <p>(22) International Filing Date: 2 August 1999 (02.08.99)</p> <p>(30) Priority Data: 09/127,919 3 August 1998 (03.08.98) US Not furnished 2 August 1999 (02.08.99) US</p> <p>(71) Applicant: INSITE VISION, INC. [US/US]; 965 Atlantic Avenue, Alameda, CA 94588 (US).</p> <p>(72) Inventors: HECKER, Karl, I.; 400 Hurricane Road, Keene, NH 03431-2161 (US). CLARK, Leslie, A.; 829 #B Lincoln Avenue, Alameda, CA 94501 (US). PFEIFFER, James, F.; 2369 Thackery Avenue, Oakland, CA 94611 (US). BOWMAN, Lyle, M.; 5135 Mount Tam Circle, Pleasanton, CA 94588 (US).</p> <p>(74) Agents: FREED, Joel, M. et al.; Howrey &amp; Simon, 1299 Pennsylvania Avenue, N.W., Box 34, Washington, DC 20004-2402 (US).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, 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, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report. 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: 30 March 2000 (30.03.00)</p>	

## (54) Title: INJECTION APPARATUS



## (57) Abstract

The present invention relates to an apparatus and method for using the apparatus for injecting an agent into a tissue, particularly into thin tissues such as the sclera of the eye. The invention provides an apparatus and method for effectively imbedding a needle into a tissue at a predetermined penetration approach angle and penetration distance thereby reducing the risk of penetrating the full thickness of the tissue. The invention includes a support element and a needle guide platform disposed on the support element with an external support surface and a channel extending therethrough and terminating in an aperture at the support surface. A needle disposed in the channel is axially movable along an axis of injection through the channel. The needle is movable from a first retracted position to an extended position corresponding to the penetration distance, along the axis of injection. In one aspect, the needle includes a sidewall defining an outlet in the needle such that when an agent is inserted into the tissue through the outlet it is in an orientation towards one of a first and second surface of the tissue. The axis of injection preferably forms a penetration approach angle of up to about 60° with a tangent of the support surface at a point of intersection of the axis of injection with the projection of the support surface across the aperture.

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 99/17381

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 A61F9/007 A61M5/46 A61M25/04				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) IPC 7 A61F 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)				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X Y  Y Y  Y	WO 95 07722 A (NORTH SHORE LABORATORIES) 23 March 1995 (1995-03-23) the whole document --- US 4 759 746 A (J.G. STRAUS) 26 July 1988 (1988-07-26) abstract; figures --- US 5 409 457 A (M. DEL CERRO ET AL.) 25 April 1995 (1995-04-25) cited in the application abstract --- US 3 890 970 A (R.L. GULLEN) 24 June 1975 (1975-06-24) abstract; figures --- -/--	1-14, 16, 17 15, 31-36, 46, 47  15  30  30		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <span style="margin-left: 200px;"><input checked="" type="checkbox"/> Patent family members are listed in annex.</span>				
° Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">                     *A* document defining the general state of the art which is not considered to be of particular relevance                      *E* earlier document but published on or after the international filing date                      *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)                      *O* document referring to an oral disclosure, use, exhibition or other means                      *P* document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     *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                      *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.                      *&amp;* document member of the same patent family                 </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *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) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*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 *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. *&* document member of the same patent family
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Date of the actual completion of the international search  <p style="text-align: center; font-weight: bold;">25 January 2000</p>	Date of mailing of the international search report  <p style="text-align: center; font-weight: bold;">04.02.2000</p>			
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  <p style="text-align: center; font-weight: bold;">Wolf, C</p>			

## INTERNATIONAL SEARCH REPORT

Int :ional Application No

PCT/US 99/17381

## 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 4 990 135 A (R.G. TRUESDALE) 5 February 1991 (1991-02-05) abstract; figures ----	30-36, 46,47
A	WO 95 32756 A (MEDTRONIC, INC.) 7 December 1995 (1995-12-07) abstract ----	30
A	US 5 674 240 A (P.M. BONUTTI ET AL.) 7 October 1997 (1997-10-07) column 7, line 62 -column 8, line 21; figures 18-21 ----	30
A	EP 0 022 977 A (L. KLING) 28 January 1981 (1981-01-28) ----	
A	DE 21 48 700 A (SIEMENS) 5 April 1973 (1973-04-05) -----	

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 99/ 17381

## 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.: 18-29, 37-45  
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 surgery
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.

## INTERNATIONAL SEARCH REPORT

International Application No. PCT/ US 99/17381

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of ) inventions in this international application, as follows:

1. Claims: 1-17

Injector comprising : support, needle guide, platform, needle, with injection axis less than  $60^\circ$  to tangent of support surface

2. Claim: 30

Catheter with inflation member, medicament reservoir and needle

3. Claims: 31-36,46,47

Support with needle platform, needle with a side wall outlet

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/17381

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