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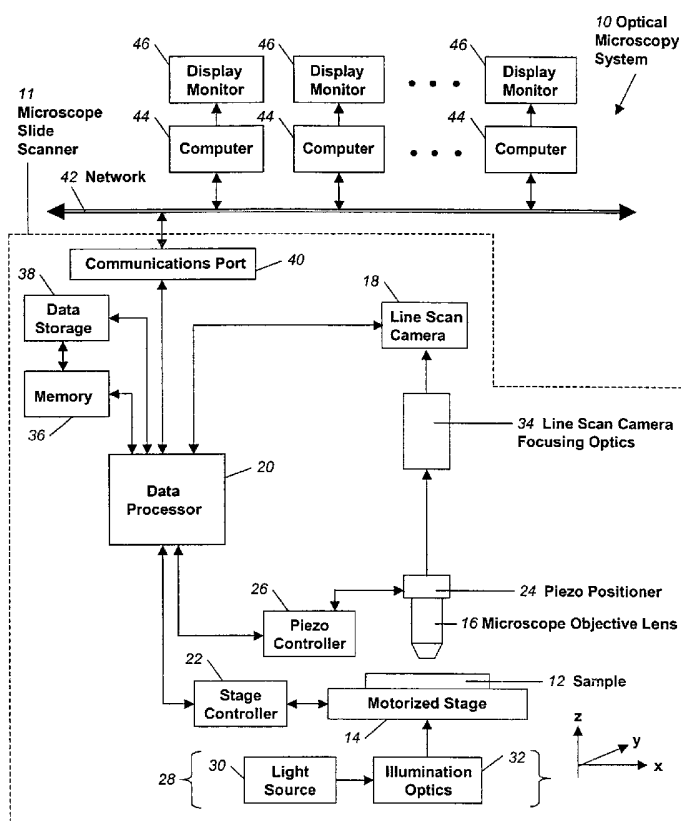
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| (71) Applicant and | | | |
| (72) Inventor: SOENKSEN, Dirk [US/US]; 3386 Avenida Nieve, Suite G, Carlsbad, CA 92009 (US). | | | |

[Continued on next page]

(54) Title: FULLY AUTOMATIC RAPID MICROSCOPE SLIDE SCANNER

(57) Abstract: Apparatus for and method of fully automatic rapid scanning and digitizing of an entire microscope sample using a computer controlled microscope slide scanner for composing the image strips obtained from successive scans of the sample into a single contiguous digital image. The method provides for statically displaying sub-regions of this large digital image at different magnifications, together with a reduced magnification macro-image of the entire sample. The method also provides for dynamically displaying portions of the contiguous digital image. In one preferred embodiment all elements of the scanner are in single-enclosure with a primary connection to the Internet or to a local intranet. In this embodiment, the preferred sample type is a microscope slide with illumination and imaging optics consistent with transmission mode optics for diffraction-limited digital imaging.





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INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER

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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 G02B G06T H04N

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)

WPI Data, PAJ, 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 A	US 5 922 282 A (LEDLEY ROBERT S) 13 July 1999 (1999-07-13) cited in the application column 7, line 57 - line 67; figures column 8 figures 1,6A,6B ---	1,31,35, 37,40 2-30, 32-34, 36,38, 39,41-48
X A	US 4 700 298 A (PALCIC BRANKO ET AL) 13 October 1987 (1987-10-13) cited in the application abstract; figures ---	1,35,37, 40 2-30, 32-34, 36,38, 39,41-48

☒ 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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Date of the actual completion of the international search

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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

Ward, S

INTERNATIONAL SEARCH REPORT

International Application No
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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.
X	WO 98 39728 A (BACUS RES LAB INC) 11 September 1998 (1998-09-11) cited in the application	49, 55, 62, 69
A	page 17, line 1 - line 27 page 30, line 32 - line 37 page 31, line 1 - line 11 figures 2, 3	1-48, 50-54, 56-61, 63-68, 70-73
A	US 5 963 314 A (FAIRLEY CHRISTOPHER R ET AL) 5 October 1999 (1999-10-05) column 13, line 30 - line 67 column 14, line 1 - line 54 figure 4	49-73
A	US 5 714 756 A (SMITH IAN R ET AL) 3 February 1998 (1998-02-03) abstract; figures 13-18	49-73
A	EP 0 871 052 A (ZEISS CARL ; ZEISS STIFTUNG (DE)) 14 October 1998 (1998-10-14) abstract; figures	1-48
A	US 3 643 015 A (DAVIDOVITS PAUL ET AL) 15 February 1972 (1972-02-15) abstract; figures	1-48
A	US 4 744 642 A (YOSHINAGA MAKOTO ET AL) 17 May 1988 (1988-05-17) abstract; figures	1-48
A	US 5 943 122 A (HOLMES DUANE C) 24 August 1999 (1999-08-24) column 5, line 8 - line 29; figures 2, 3	1-48
A	US 4 760 385 A (JANSSON PETER A ET AL) 26 July 1988 (1988-07-26) cited in the application abstract; figures	1-48
A	US 5 912 699 A (HAYENGA JON W ET AL) 15 June 1999 (1999-06-15) cited in the application abstract; figures	1-48
A	US 5 793 969 A (KAMENTSKY LOUIS A ET AL) 11 August 1998 (1998-08-11) cited in the application abstract; figures	1-73

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US 01/08028

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.

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

1. Claims: 1-48

Digitizing scanning microscope

2. Claims: 49-73

Computer image viewing frame

INTERNATIONAL SEARCH REPORT

International Publication No
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5922282	A	13-07-1999	NONE
US 4700298	A	13-10-1987	CA 1272285 A1 31-07-1990 EP 0175549 A2 26-03-1986 JP 61094014 A 12-05-1986
WO 9839728	A	11-09-1998	US 6101265 A 08-08-2000 US 6272235 B1 07-08-2001 AU 6541298 A 22-10-1998 AU 6677098 A 22-09-1998 EP 1021786 A1 26-07-2000 EP 1016031 A1 05-07-2000 JP 2001519944 T 23-10-2001 US 2002061127 A1 23-05-2002 WO 9839728 A1 11-09-1998 WO 9844446 A1 08-10-1998 US 6226392 B1 01-05-2001
US 5963314	A	05-10-1999	US 5479252 A 26-12-1995 US 6288782 B1 11-09-2001 US 5594235 A 14-01-1997 US 5808735 A 15-09-1998 US 5798830 A 25-08-1998 US 5923430 A 13-07-1999 US 2002012118 A1 31-01-2002
US 5714756	A	03-02-1998	US 5877891 A 02-03-1999 US 5448399 A 05-09-1995 US 6057547 A 02-05-2000 US 6265718 B1 24-07-2001 US 6130427 A 10-10-2000 US 5939719 A 17-08-1999 US 2001054691 A1 27-12-2001 AU 3794893 A 05-10-1993 EP 0746857 A1 11-12-1996 JP 7504749 T 25-05-1995 WO 9318525 A1 16-09-1993 US 5672816 A 30-09-1997
EP 0871052	A	14-10-1998	DE 19714221 A1 08-10-1998 EP 0871052 A1 14-10-1998 JP 10326587 A 08-12-1998 US 2001012069 A1 09-08-2001
US 3643015	A	15-02-1972	NONE
US 4744642	A	17-05-1988	JP 2075182 C 25-07-1996 JP 7083043 B 06-09-1995 JP 61179549 A 12-08-1986 JP 2501098 B2 29-05-1996 JP 61009614 A 17-01-1986 JP 61158313 A 18-07-1986 JP 1877063 C 07-10-1994 JP 6001296 B 05-01-1994 JP 61158310 A 18-07-1986 AT 52347 T 15-05-1990 AT 42004 T 15-04-1989 DE 3577355 D1 31-05-1990

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/08028

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4744642 A		DE 3662731 D1 EP 0169387 A2 EP 0193001 A1 US 4832474 A	11-05-1989 29-01-1986 03-09-1986 23-05-1989
US 5943122 A	24-08-1999	EP 0971218 A2 JP 2000039398 A	12-01-2000 08-02-2000
US 4760385 A	26-07-1988	US 4673988 A AU 568242 B2 AU 5643586 A AU 581575 B2 AU 8015287 A CA 1284375 A1 DK 181986 A EP 0199573 A2 GR 861042 A1 JP 61248168 A	16-06-1987 17-12-1987 30-10-1986 23-02-1989 18-02-1988 21-05-1991 23-10-1986 29-10-1986 12-08-1986 05-11-1986
US 5912699 A	15-06-1999	AU 703583 B2 AU 3409095 A CA 2199407 A1 DE 809911 T1 EP 0809911 A1 ES 2123471 T1 JP 10505721 T WO 9608106 A1 AU 3723993 A WO 9316439 A1	25-03-1999 27-03-1996 14-03-1996 19-11-1998 03-12-1997 16-01-1999 02-06-1998 14-03-1996 03-09-1993 19-08-1993
US 5793969 A	11-08-1998	US 5587833 A AU 1702397 A WO 9725678 A1 CA 2166464 A1 EP 0707715 A1 IL 110257 A JP 9503868 T WO 9502204 A1 WO 9748999 A1 US 5602674 A US 5790308 A	24-12-1996 01-08-1997 17-07-1997 19-01-1995 24-04-1996 28-09-2000 15-04-1997 19-01-1995 24-12-1997 11-02-1997 04-08-1998