

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 January 2002 (03.01.2002)

PCT

(10) International Publication Number
WO 02/00280 A3

(51) International Patent Classification⁷: **A61M 15/00**

(74) Agent: **LEVI-MINZI, Simona**; Ivax Corporation, 4400 Biscayne Boulevard, Miami, FL 33137 (US).

(21) International Application Number: PCT/US01/20097

(22) International Filing Date: 23 June 2001 (23.06.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/213,667 23 June 2000 (23.06.2000) US
60/213,382 23 June 2000 (23.06.2000) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, 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, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(71) Applicants (*for BB only*): **IVAX CORPORATION** [US/US]; 4400 Biscayne Boulevard, Miami, FL 33137 (US). **NORTON HEALTHCARE LTD.** [GB/GB]; Albert Basin, Royal Docks, London E16 2QJ (GB).

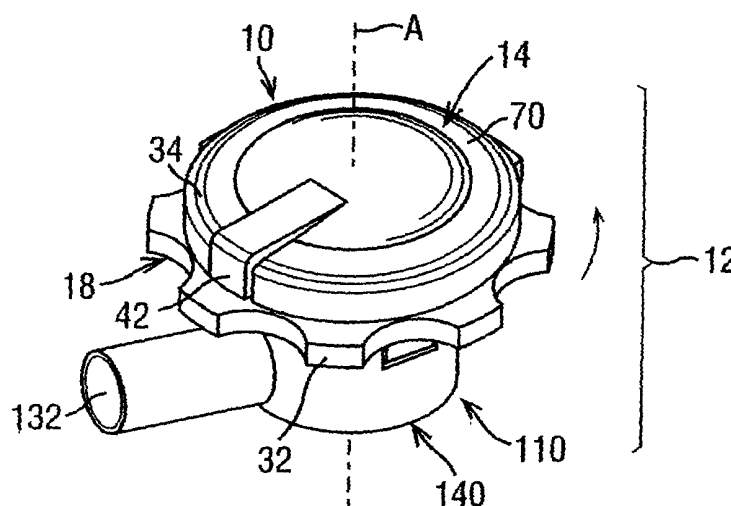
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: PRE-METERED DOSE MAGAZINE FOR BREATH-ACTUATED DRY POWDER INHALER



(57) Abstract: A pre-metered dose assembly for consistently supplying precise doses of medicament is provided for a breath-actuated dry powder inhaler. The assembly includes a cap defining a dry powder delivery passageway for providing air to dry powder supply port of a swirl chamber of a breath-actuated dry powder inhaler, and a magazine including a plurality of reservoirs for holding pre-metered doses of dry powder. One of the magazine and the cap is movable with respect to the other of the magazine and the cap for sequentially positioning the reservoirs within the delivery passageway of the cap. A breath-induced low pressure at an outlet port of the swirl chamber of the inhaler causes an air flow through the dry powder delivery passageway of the assembly and into the dry powder supply port of the swirl chamber that entrains dry powder from the reservoir positioned in the passageway for inhalation by a patient using the inhaler. The present disclosure also provides a breath-actuated dry powder inhaler including the pre-metered dose assembly in combination with a de-agglomerator for breaking up aggregates and micronizing particles of dry powder prior to inhalation of the powder by a patient.



WO 02/00280 A3



(88) Date of publication of the international search report:
2 May 2002

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

Int. Application No

PCT/US 01/20097

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M15/00

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 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	WO 99 36116 A (SINOT SANDER JEROEN ;PHARMACHEMIE BV (NL); GELDEREN WILHELMUS MARI) 22 July 1999 (1999-07-22)	1-4, 6-14,19, 20
Y	page 4, line 10 -page 6, line 15; figures 2-5	5,17,18
Y	GB 2 264 237 A (NEWELL ROBERT EDWARD) 25 August 1993 (1993-08-25) claim 9; figure 4	18
Y	US 6 006 747 A (GREENSPAN BERNARD ET AL) 28 December 1999 (1999-12-28) column 2, line 57 -column 3, line 15; figures 2A,4-4E column 4, line 30 -column 5, line 23	5,17
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ 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
- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search

20 February 2002

Date of mailing of the international search report

27/02/2002

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

Villeneuve, J-M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/20097

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 525 720 A (NEW ENGLAND PHARM INC) 3 February 1993 (1993-02-03) abstract; figures 64-6D page 3, paragraph 2 ----	1-3,6, 14,19,21
X	US 6 065 472 A (ANDERSON GREGOR JOHN MCLENNAN ET AL) 23 May 2000 (2000-05-23) claims; figures ----	1-10,12, 13,15, 21-25
A	US 5 458 135 A (PATTON JOHN S ET AL) 17 October 1995 (1995-10-17) figures 8-11C ----	22,23,26
A	US 5 388 572 A (FOXEN THOMAS ET AL) 14 February 1995 (1995-02-14) column 6, line 40 - line 60; figures 1-3 ----	17
A	US 5 622 166 A (CAMERON ALLAN ET AL) 22 April 1997 (1997-04-22) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/20097

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9936116	A	22-07-1999	NL 1008031 C2	21-07-1999
			AU 1986099 A	02-08-1999
			EP 1047468 A1	02-11-2000
			WO 9936116 A1	22-07-1999
			ZA 9900283 A	08-12-1999

GB 2264237	A	25-08-1993	NONE	

US 6006747	A	28-12-1999	AU 741132 B2	22-11-2001
			AU 6761498 A	12-10-1998
			BR 9808579 A	30-05-2000
			CN 1251050 T	19-04-2000
			EP 1009461 A1	21-06-2000
			HU 0001799 A2	28-09-2000
			JP 2001516251 T	25-09-2001
			NO 994564 A	20-09-1999
			WO 9841265 A1	24-09-1998
			US 6273085 B1	14-08-2001

EP 0525720	A	03-02-1993	US 5337740 A	16-08-1994
			AT 146363 T	15-01-1997
			AU 665765 B2	18-01-1996
			AU 2038492 A	04-02-1993
			CA 2075113 A1	02-02-1993
			DE 69215994 D1	30-01-1997
			DE 69215994 T2	26-06-1997
			DK 525720 T3	12-05-1997
			EP 0525720 A1	03-02-1993
			ES 2097839 T3	16-04-1997
			FI 923404 A	02-02-1993
			GR 3022762 T3	30-06-1997
			JP 2088665 C	02-09-1996
			JP 5192404 A	03-08-1993
			JP 7108316 B	22-11-1995
			MX 9204499 A1	01-02-1993
			NO 305852 B1	09-08-1999
			NZ 243649 A	27-06-1995
			US 5529059 A	25-06-1996
			US 5715810 A	10-02-1998
			ZA 9205718 A	28-02-1994

US 6065472	A	23-05-2000	AT 209053 T	15-12-2001
			AT 209939 T	15-12-2001
			AU 725348 B2	12-10-2000
			AU 1163397 A	01-08-1997
			BR 9612410 A	13-07-1999
			CA 2241880 A1	17-07-1997
			CN 1213974 A	14-04-1999
			CZ 9802125 A3	11-11-1998
			DE 69617754 D1	17-01-2002
			EP 0883414 A2	16-12-1998
			EP 0938907 A1	01-09-1999
			WO 9725086 A2	17-07-1997
			JP 2000503565 T	28-03-2000
			NO 983069 A	03-09-1998
			NZ 324374 A	29-06-1999
			NZ 334058 A	29-06-1999
			PL 327616 A1	21-12-1998

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/20097

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6065472	A	TR 9801265 T2	21-10-1998
		TR 9900235 T2	21-04-1999
		HU 9904274 A2	28-04-2000
US 5458135	A 17-10-1995	US 5775320 A	07-07-1998
		US 6138668 A	31-10-2000
		AT 189124 T	15-02-2000
		AU 662919 B2	21-09-1995
		AU 2309192 A	11-02-1993
		CA 2112674 A1	21-01-1993
		DE 69230613 D1	02-03-2000
		DE 69230613 T2	28-12-2000
		DK 592540 T3	26-06-2000
		EP 0592540 A1	20-04-1994
		EP 0940154 A2	08-09-1999
		ES 2141108 T3	16-03-2000
		GR 3032973 T3	31-07-2000
		JP 7501231 T	09-02-1995
		JP 3230056 B2	19-11-2001
		KR 246082 B1	01-04-2000
		WO 9300951 A1	21-01-1993
US 5388572	A 14-02-1995	AU 7393994 A	22-05-1995
		BR 9407893 A	19-11-1996
		CA 2157583 A1	04-05-1995
		CN 1120812 A	17-04-1996
		EP 0732951 A1	25-09-1996
		FI 954099 A	01-09-1995
		JP 9504455 T	06-05-1997
		NO 953427 A	09-10-1995
		WO 9511715 A1	04-05-1995
US 5622166	A 22-04-1997	AU 695051 B2	06-08-1998
		AU 5251096 A	18-11-1996
		BG 62921 B1	30-11-2000
		BG 101992 A	31-07-1998
		BR 9608194 A	21-07-1998
		CA 2217672 A1	31-10-1996
		CN 1181709 A	13-05-1998
		CZ 9703349 A3	14-01-1998
		EP 0835147 A1	15-04-1998
		HU 9801656 A2	28-10-1998
		IL 117706 A	30-11-1999
		JP 10512788 T	08-12-1998
		NO 974910 A	24-10-1997
		NZ 304654 A	28-01-1999
		PL 322909 A1	02-03-1998
		RO 115407 B1	28-02-2000
		SK 144697 A3	04-03-1998
		TW 384225 B	11-03-2000
		WO 9633759 A1	31-10-1996
		US 5921237 A	13-07-1999
		US 6029663 A	29-02-2000