

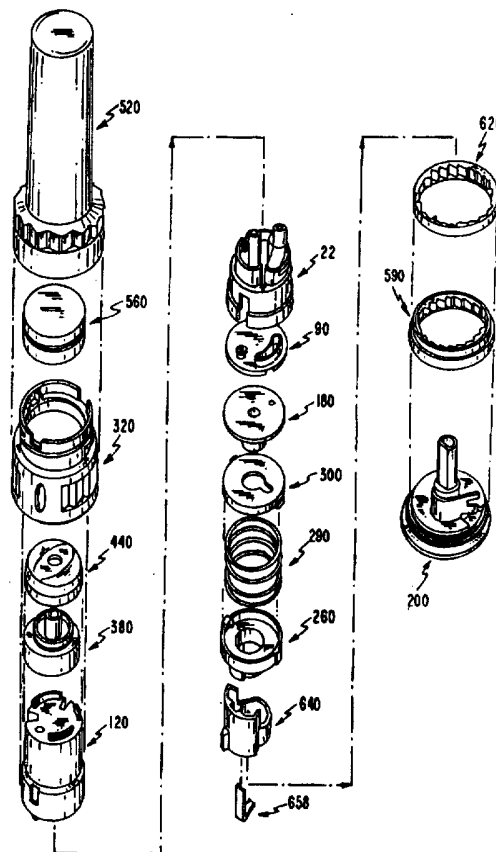


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>A61M 15/00</b>	<b>A3</b>	<b>(11) International Publication Number:</b> <b>WO 97/30743</b> <b>(43) International Publication Date:</b> 28 August 1997 (28.08.97)
<b>(21) International Application Number:</b> PCT/US97/01562 <b>(22) International Filing Date:</b> 13 February 1997 (13.02.97)  <b>(30) Priority Data:</b> 08/604,549                      21 February 1996 (21.02.96)                      US  <b>(71) Applicant:</b> SCHERING CORPORATION [US/US]; 2000 Galloping Hill Road, Kenilworth, New Jersey 07033 (US).  <b>(72) Inventors:</b> AMBROSIO, Thomas, J.; 31 Eastern States Parkway, Sommerville, NJ 08876 (US). BENSON, Warren, A., Jr.; 980 280th Street, Woodville, WI 54028 (US). DAO, Kim, C.; 25 Fern Terrace, Wayne, NJ 07470 (US). KENYON, David, J.; 4 Log Road, Morristown, NJ 07960 (US). KREISER, Walter, J.; 21650 Sylvander, Barrington, IL 60010 (US). SCHONEBAUM, Theodore, J.; 3003 Wilson Street, Lot 76, Monomonic, WI 54751 (US). VOGEL, Allen, J.; 5729 Butler Lane, Long Grove, IL 60047 (US). WALKER, Louis, B.; 809 24th Street, Menomonie, WI 54751 (US). YANG, Tsong-Toh; 9 Old Farm Road, Warren, NJ 07059 (US).  <b>(74) Agents:</b> FRANKS, Robert, A. et al.; Schering-Plough Corporation, Patent Dept. K-6-1 1990, 2000 Galloping Hill Road, Kenilworth, NJ 07033-0530 (US).		<b>(81) Designated States:</b> AL, AM, AU, AZ, BA, BB, BG, BR, BY, CA, CN, CZ, EE, GE, HU, IL, IS, JP, KG, KR, KZ, LC, LK, LR, LT, LV, MD, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TJ, TM, TR, TT, UA, UZ, VN, YU, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, 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).  <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>  <b>(88) Date of publication of the international search report:</b> 13 November 1997 (13.11.97)

**(54) Title:** POWDERED MEDICATION INHALER**(57) Abstract**

A powder dispenser includes a reservoir body including a supply of powder and an inhalation conduit; a driving body for rotating the reservoir body and including upper recesses and two spring fingers in lower driving recesses thereof; a rotatable metering plate for carrying a metered amount of powder from the supply to the inhalation conduit, and having an underside with ribs; a gas permeable retainer welded to the ribs; a spring biasing the metering plate toward the reservoir body; a nozzle having spiked ribs welded in the upper recesses of the driving body and including a chimney with vertical flutes; an adapter non-rotatably mounted with respect to the metering plate and including two locking recesses for receiving the spring fingers for locking engagement and two helical cam tracks with a square cross section; a closure cap covering the driving body and including priming ribs biasing the spring fingers out of the locking recesses and engaging with the locking recesses to rotate the driving body, and two cams riding within the cam tracks; a base non-rotatably connected with the metering plate; and a counter rotatably mounted on the base and including rotatable counter rings providing a visual count of the number of doses of powder to be dispensed, and a pawl assembly engaging with gear teeth of the counter rings for rotating the same, the pawl assembly including an outer wall, a pawl and a pawl spring integrally molded as a single piece.



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# INTERNATIONAL SEARCH REPORT

Intern. Appl. No.  
PCT/US 97/01562

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 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 6 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.
Y	WO 94 14492 A (SCHERING CORP ;AMBROSIO THOMAS J (US); ASHLEY CHARLES R (US); BILA) 7 July 1994	1,2,5-8
A	see page 38, line 10 - line 25 see page 39, line 34 - page 40, line 26; figures 4,49	37
Y	US 4 907 583 A (WETTERLIN KJELL I L ET AL) 13 March 1990	1,2,5-8
A	see abstract; figure 1	37
A	EP 0 652 022 A (TEIJIN LTD) 10 May 1995 see column 12, line 52 - line 59; figure 1	37

☐ 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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- \*&\* document member of the same patent family

Date of the actual completion of the international search  13 June 1997	Date of mailing of the international search report  30. 09. 97
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

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/01562

### 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:

PLEASE SEE ANNEX

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.:

1-8, 37

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 97 01562

FURTHER INFORMATION CONTINUED FROM PCT/ISA210

Subject N° 1 : Claims 1-8, 37.

Powder inhaler with irregularities in the chimney.

Subject N° 2 : Claims 9-13.

Powder inhaler with driving body having recesses and nozzle having ribs.

Subject N° 3 : Claims 14-18.

Powder inhaler with driving body including a locking finger and adapter including a locking recess receiving the finger.

Subject N° 4 : Claims 19-21.

Powder inhaler with adapter including a cam track and closure cap including a cam.

Subject N° 5 : Claims 22-26.

Powder inhaler with metering plate having ribs fused in the retainer.

Subject N° 5 : Claims 27,28.

Method for including a retainer in the metering plate of a powder inhaler during moulding.

Subject N° 7 : Claims 29-36.

Powder inhaler with pawl means including an integrally moulded spring.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. Application No

PCT/US 97/01562

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9414492 A	07-07-94	AU 5748794 A	19-07-94
		CA 2152088 A	07-07-94
		CN 1091321 A	31-08-94
		CZ 9501535 A	15-05-96
		EP 0674533 A	04-10-95
		FI 952976 A	16-06-95
		HU 73522 A	28-08-96
		IL 108061 A	10-06-97
		JP 8500756 T	30-01-96
		NO 952429 A	18-08-95
		NZ 259241 A	20-12-96
		PL 309401 A	02-10-95
		SK 80695 A	07-02-96
		ZA 9309472 A	19-06-95
US 4907583 A	13-03-90	SE 453566 B	15-02-88
		SG 92094 A	17-03-95
		AU 601400 B	13-09-90
		AU 6960487 A	10-09-87
		CA 1276848 A	27-11-90
		CY 1798 A	17-02-95
		DE 3775433 A	06-02-92
		DK 115487 A	08-09-87
		EG 18100 A	30-06-93
		EP 0237507 A	16-09-87
		FI 88679 C	28-06-93
		HK 80194 A	19-08-94
		HR 920761 A	30-04-95
		IE 60112 B	01-06-94
		IN 168166 A	16-02-91
		JP 2113284 C	21-11-96
		JP 8024715 B	13-03-96
		JP 62221366 A	29-09-87
		KR 9607754 B	12-06-96
		SE 8601060 A	08-09-87
EP 0652022 A	10-05-95	SI 8710341 A	28-02-97
		ZA 8701346 A	07-09-87
EP 0652022 A	10-05-95	AU 6690694 A	12-12-94
		FI 950130 A	10-03-95

### Information on patent family members

PCT/US 97/01562

Form PCT/ISA/210 (patent family annex) (July 1992)