



(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 812 987 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
02.06.1999 Bulletin 1999/22

(51) Int. Cl.⁶: **F04B 27/18**

(43) Date of publication A2:
17.12.1997 Bulletin 1997/51

(21) Application number: **97109232.5**

(22) Date of filing: 06.06.1997

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

(30) Priority: 07.06.1996 JP 145765/96

(71) Applicant:
**Kabushiki Kaisha
Toyoda Jidoshokki Seisakusho
Aichi-ken (JP)**

(72) Inventors:

- **Kawaguchi, Masahiro**
Kariva-shi, Aichi-ken (JP)

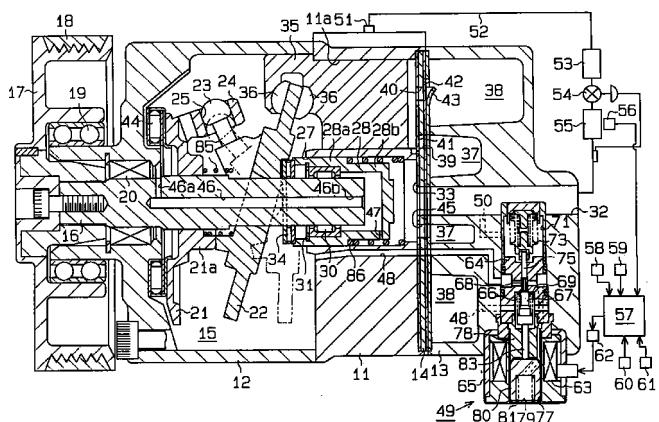
- Sonobe, Masanori
Kariya-shi, Aichi-ken (JP)
- Fukanuma, Tetsuhiko
Kariya-shi, Aichi-ken (JP)
- Nagai, Hiroyuki
Kariya-shi, Aichi-ken (JP)

(74) Representative:
Pellmann, Hans-Bernd, Dipl.-Ing. et al
Patentanwaltsbüro
Tiedtke-Bühling-Kinne & Partner
Bavariaring 4
80336 München (DE)

(54) Variable displacement compressor

(57) An improved variable displacement compressor is disclosed. A compressor has a cam plate (22) that is mounted on a drive shaft (16) for integral rotation therewith. At least one piston (35) is coupled to the cam plate (22). The cam plate (22) is tiltable between its maximum inclining position and its minimum inclining position with respect to an axis of the drive shaft (16). The piston (35) reciprocates in a cylinder bore by a stroke based on an inclined angle of the cam plate (22) and compresses gas that is supplied to the cylinder bore (11a) from an external gas circuit (52) and discharge the compressed gas to the external gas circuit (52) that is connected to the interior of compressor by way of a gas passage (32). The shutter body (28) is urged by a first spring (85, 91) and a second spring (86) in opposite directions. The urging force of the first spring (85, 92) is greater than that of the second spring (86). A shutter body (28) that is biased to disconnect the gas passage (32) from the external gas circuit (52).

Fig.1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 9232

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.6)		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim			
X	DE 195 17 333 A (TOYODA AUTOMATIC LOOM WORKS) 16 November 1995 * column 9, line 6 - line 21 * * column 10, line 27 - line 30 * * figure 1 * ---	1,2	F04B27/18		
X	DE 195 17 334 A (TOYODA AUTOMATIC LOOM WORKS) 16 November 1995 * column 4, line 51 - column 5, line 26 * * column 8, line 31 - line 37 * ---	1,2			
P, X	EP 0 748 937 A (TOYODA AUTOMATIC LOOM WORKS) 18 December 1996 * column 11, line 57 - column 12, line 14 * ---	1-3			
P, X	EP 0 716 228 A (TOYODA AUTOMATIC LOOM WORKS) 12 June 1996 * column 13, line 36 - line 49 * ---	1-3			
A	EP 0 628 722 A (TOYODA AUTOMATIC LOOM WORKS) 14 December 1994 * claim 1; figure 1 * -----	1	<div style="display: flex; justify-content: space-between;"> <div style="flex: 1;"> TECHNICAL FIELDS SEARCHED (Int.Cl.6) </div> <div style="flex: 1; text-align: right;">F04B</div> </div>		
The present search report has been drawn up for all claims					
Place of search	Date of completion of the search	Examiner			
THE HAGUE	13 April 1999	Engelbrecht, P			
CATEGORY OF CITED DOCUMENTS					
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document					
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document					

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 97 10 9232

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-04-1999

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
DE 19517333	A	16-11-1995		JP 8159026 A US 5713725 A		18-06-1996 03-02-1998
DE 19517334	A	16-11-1995		JP 7310654 A KR 146771 B US 5681150 A		28-11-1995 17-08-1998 28-10-1997
EP 0748937	A	18-12-1996		JP 8338364 A CA 2178875 A CN 1149107 A US 5865604 A		24-12-1996 14-12-1996 07-05-1997 02-02-1999
EP 0716228	A	12-06-1996		JP 8159023 A US 5636973 A		18-06-1996 10-06-1997
EP 0628722	A	14-12-1994		JP 6346845 A JP 7019165 A CA 2125233 A DE 69401853 D DE 69401853 T KR 9704811 B US 5797730 A		20-12-1994 20-01-1995 09-12-1994 10-04-1997 16-10-1997 04-04-1997 25-08-1998