

Title (en)  
Multi-stage piston type compressor with reduced power input during idle running

Title (de)  
Mehrstufiger Kolbenverdichter mit reduzierter Leistungsaufnahme im Leerlauf

Title (fr)  
Compresseur à pistons multi-étages ayant un gain en puissance réduit à vide

Publication  
**EP 1650434 B2 20160413 (DE)**

Application  
**EP 05022666 A 20051018**

Priority  
DE 102004051097 A 20041019

Abstract (en)  
[origin: EP1650434A2] The multi level piston compressor has an intake valve chamber (13) whereby upstream compressor level (1) is arranged on the intake valve. An auxiliary valve (16) is connected with the cylinder space (11). The auxiliary valve is in stand still state in open position and moves in closed position. The differential pressure is examined in the down stream compressor level (2) of the exhaust valve chamber (25).

IPC 8 full level  
**F04B 25/00** (2006.01); **F04B 39/08** (2006.01); **F04B 49/03** (2006.01); **F04B 49/08** (2006.01); **F04B 49/22** (2006.01)

CPC (source: EP)  
**F04B 25/00** (2013.01); **F04B 25/005** (2013.01); **F04B 39/08** (2013.01); **F04B 49/03** (2013.01); **F04B 49/08** (2013.01); **F04B 49/225** (2013.01); **F04B 2205/07** (2013.01)

Citation (opposition)  
Opponent :

- DE 374317 C 19230421 - EHRHARDT & SEHMER AKT GES
- EP 0091994 B1 19870304
- AT 187616 B 19561110 - HOERBIGER & CO
- DE 681654 C 19390928 - KNORR BREMSE AG
- DE 2449233 A1 19750507 - LUFT U KAELETETECHNIK VEB K
- DE 1775366 A1 19710708 - SVENSKA TEMPUS AB
- DE 857259 C 19521127 - HOERBIGER & CO
- DE 954000 C 19561213 - HOERBIGER & CO
- DE 405798 C 19241108 - HUGO HEINRICH
- DE 3032002 C2 19860116
- DE 1403953 A1 19681121 - ATLAS COPCO AB
- DE 4105593 A1 19910919 - HOERBIGER VENTILWERKE AG [AT]
- DE 1628165 A1 19720113 - HOERBIGER VENTILWERKE AG
- DE 2901513 A1 19800724 - KNORR BREMSE GMBH
- DE 366401 C 19230104 - JOSEF HEINRICI

Cited by  
DE102013001147A1; DE102014202265A1; DE102007006641A1; EP4390128A1; EP2708745A1; DE102012108576A1; WO2014114659A1; DE102007037687B3; DE102009053133A1; US2011123377A1; DE102019119944A1; WO2021013670A1; EP1956240A1; DE102022134427A1; EP2715136B1; DE102021104789A1

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

DOCDB simple family (publication)  
**EP 1650434 A2 20060426; EP 1650434 A3 20070103; EP 1650434 B1 20080123; EP 1650434 B2 20160413**; AT E384871 T1 20080215; DE 502005002636 D1 20080313

DOCDB simple family (application)  
**EP 05022666 A 20051018**; AT 05022666 T 20051018; DE 502005002636 T 20051018