

Title (en)  
Vacuum pump apparatus.

Title (de)  
Vakuumpumpe.

Title (fr)  
Pompe à vide.

Publication  
**EP 0226039 A1 19870624 (EN)**

Application  
**EP 86115640 A 19861111**

Priority  
JP 25271185 A 19851113

Abstract (en)  
A vacuum pump apparatus of a unitary construction type has a plurality of pump stages of different types arranged in a housing (4) and between suction (2) and discharge ports (3) therein. The apparatus further has a gas passage (17) for introducing a gas having a molecular weight higher than that of the gas sucked through the suction port (2) into a pump stage spaced downstream from the suction port (2) by more than one pump stage. The compression ratio across the pump stage into which the gas of the higher molecular weight is introduced is increased to enable the pump of an upstream stage to operate with a required discharge pressure, whereby a high level of vacuum can be established at the suction port (2) of the vacuum pump apparatus.

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**F04D 19/04**; **F04D 25/16**

IPC 8 full level  
**F04D 19/04** (2006.01); **F04D 25/16** (2006.01)

CPC (source: EP)  
**F04D 17/168** (2013.01); **F04D 19/046** (2013.01); **F04D 23/008** (2013.01); **F04D 25/16** (2013.01)

Citation (search report)  
• [X] DE 2526164 A1 19761230 - LEYBOLD HERAEUS GMBH & CO KG  
• [X] DE 2507430 A1 19760826 - SCHITTKE FRANZ JOSEF DIPL PHYS  
• [Y] EP 0143684 A1 19850605 - BERTIN & CIE [FR]  
• [A] DE 2408257 A1 19750904 - LEYBOLD HERAEUS GMBH & CO KG

Cited by  
GB2360066A; EP0731278A1; EP1363027A1; US7645116B2; EP0340685A3; EP0445855A1; EP0643227A1; US5611660A; US5238362A; GB2208895A; GB2208895B; EP0959253A3; CN106062374A; RU2667563C2; US7938619B2; WO2004055378A1; WO2008142435A1; US10473109B2; WO2015132196A1

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