

Title (en)  
MULTISTAGE VACUUM PUMP UNIT

Publication  
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Application  
**EP 89110607 A 19890612**

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DE 3821437 A 19880624

Abstract (en)  
[origin: WO8912751A1] The invention concerns a multi-stage vacuum-pump set in which an oil-lubricated or dry-running mechanical displacement-type pump is used for the last, atmospheric, stage, the displacement pump being connected on the vacuum side to at least one other pump. Oil consumption can be reduced and efficiency increased by using a gas-ring pump (2) as the pump connected on the vacuum side.

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**F04D 23/008** (2013.01 - EP US); **F04D 25/16** (2013.01 - EP US)

Citation (examination)  
• DE 3545982 A1 19870702 - BUSCH GMBH K [DE]  
• "Auswahlkriterien für Pumpen zum Erzeugen von Vakuum", Maschinenmarkt, Würzburg 88(1982), S. 286-289

Cited by  
CN105756936A; DE102004038924A1; DE102004038924B4; FR2978214A1; EP2549112A3; DE102004010061B3; DE102004010061B9;  
CN1065026C; DE19500823A1; WO9840194A1

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ES 2030561 T3 19921101; JP H03500007 U 19911205; JP H0545827 Y2 19931126; US 5244352 A 19930914; WO 8912751 A1 19891228

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