

Title (en)  
Pneumatic cylinder with cushioning means

Title (de)  
Pneumatikzylinder mit Dämpfungsmitteln

Title (fr)  
Vérin pneumatique avec dispositif d'amortissement

Publication  
**EP 1435461 A1 20040707 (EN)**

Application  
**EP 03104805 A 20031218**

Priority  
DE 10261412 A 20021230

Abstract (en)  
A pneumatic cylinder comprising a cylinder tube (1), a piston (3) sliding within the cylinder tube (1), at least one piston packing ring (13a;13b) disposed on the outer peripheral surface of the piston (3) for defining at least one pressure chamber (6a;6b), at least one port (5a;5b) for supplying and discharging compressed air to and from said pressure chamber (6a;6b) separated by the piston (3), a respective air outlet (7a;7b) for communicating with the pressure chamber (6a;6b) associated with a port (5a;5b) and positioned with an axial cushioning distance (X) to the end of the cylinder tube (1), cushioning means for stopping the piston (3) in a cushioning manner by restraining the discharged air flow from the pressure chamber (6a;6b), wherein said cushioning means comprise at least one piston channel (9a;9b) with a cushioning nozzle (8a;8b) arranged in the piston (3) in order to discharge compressed air within the pressure chamber (6a;6b) only through the cushioning nozzle (8a;8b) when the piston packing ring (13a;13b) passes over the air outlet (7a;7b) on the discharge side just before the piston (3) reaches the end of its stroke, wherein furthermore the piston channel (9a;9b) connects the pressure chamber (6a;6b) with the air outlet (7a;7b). <IMAGE>

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**F15B 15/22**

IPC 8 full level  
**F15B 15/22** (2006.01)

CPC (source: EP)  
**F15B 15/224** (2013.01)

Citation (search report)  
• [XY] US 6186043 B1 20010213 - CALLIES ROBERT EDWIN [US]  
• [X] DE 29700256 U1 19970313 - SCHAEFF KARL GMBH & CO [DE]  
• [X] US 3592106 A 19710713 - BAUGHMAN GAYLORD G  
• [X] US 3626812 A 19711214 - TRICK ROBERT E  
• [AY] US 3961564 A 19760608 - RICH BELDON R, et al  
• [AY] US 4455923 A 19840626 - MUELLER RICHARD [DE]  
• [AY] US 4257499 A 19810324 - DESCHNER RICHARD E  
• [AY] US 5193433 A 19930316 - REIMER JENS [SE]  
• [AY] DE 19903511 A1 20000803 - ZAHNRADFABRIK FRIEDRICHSHAFEN [DE]  
• [AY] US 6279451 B1 20010828 - HIRANO AKIHIRO [JP], et al

Cited by  
CN102454662A; CN104712610A; CN103148053A; CN113685393A; US8863641B2; WO2009147405A1; US11067104B1; EP3882135A1; JP2011522193A; US11820495B2

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