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(54) **VAPOR CONTROL VALVE WITH A METALLIC SEALING ELEMENT**

(75) Inventors: **Axel Frohwein**, Treuchtlingen (DE);  
**Lydie Regnier**, Pappenheim (DE)

(73) Assignee: **Alfmeier Prazision AG Baugruppen und Systemlosungen**, Treuchtlingen (DE)

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4,878,511 A	11/1989	Fox	
4,905,726 A	3/1990	Kasugai et al.	
4,982,757 A	1/1991	Ohasi et al.	
5,028,244 A *	7/1991	Szlaga .....	137/202
5,044,389 A	9/1991	Gimby	
5,090,459 A	2/1992	Aoki et al.	
5,183,087 A	2/1993	Aubel et al.	
5,215,110 A	6/1993	Benjoy	
5,265,644 A	11/1993	Tuckey	
5,388,611 A	2/1995	Harris	
5,402,818 A	4/1995	Kasugai et al.	
5,421,306 A	6/1995	Talaski	
5,449,018 A	9/1995	Harris	
5,449,029 A	9/1995	Harris	

(List continued on next page.)

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(58) **Field of Search** ..... **137/43, 202**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,990,842 A	*	7/1961	Good .....	137/202
3,614,960 A	*	10/1971	Pfrenge .....	137/202
4,679,580 A		7/1987	Devall et al.	
4,815,705 A		3/1989	Kasugai et al.	

*Primary Examiner*—Gerald A. Michalsky  
(74) *Attorney, Agent, or Firm*—Dority & Manning, P.A.

(57) **ABSTRACT**

A fuel vapor control valve for use in a vehicle fuel system is provided. The control valve has a rollover valve assembly with a valve member defining a point-bearing surface, a housing with an opening, and a chamber. The housing is mountable to a fuel tank. The valve member is movable within the chamber and a sealing element is movably located on the point-bearing surface of the valve member. The sealing element may be metallic and is configured to releasably seal the opening when the valve member is urged in a direction towards the opening.

**40 Claims, 7 Drawing Sheets**

