	Application papers.	Date Mailed			Date Mailed
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search	updated	1-14-03	FL

	Date	Exmr.
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U.S.DEPARTMENT OF COMMERCE
Patent and Trademark Office

US006540815B1

(12) **United States Patent**
Hiltzik et al.

(10) **Patent No.: US 6,540,815 B1**
(45) **Date of Patent: Apr. 1, 2003**

(54) **METHOD FOR REDUCING EMISSIONS FROM EVAPORATIVE EMISSIONS CONTROL SYSTEMS**

(75) Inventors: **Laurence H. Hiltzik**, Charleston, SC (US); **Jacek Z. Jagiello**, Charleston, SC (US); **Edward D. Tolles**, Charleston, SC (US); **Roger S. Williams**, Lexington, VA (US)

(73) Assignee: **MeadWestvaco Corporation**, Stamford, CT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/100,362**

(22) Filed: **Mar. 18, 2002**

Related U.S. Application Data

(60) Provisional application No. 60/335,897, filed on Nov. 21, 2001.

(51) **Int. Cl.**[7] **F02M 33/02**; B01D 53/04

(52) **U.S. Cl.** **95/146**; 95/900; 123/519

(58) **Field of Search** 95/90, 146, 148, 95/900–903; 96/132, 133, 147; 123/518, 519; 502/416

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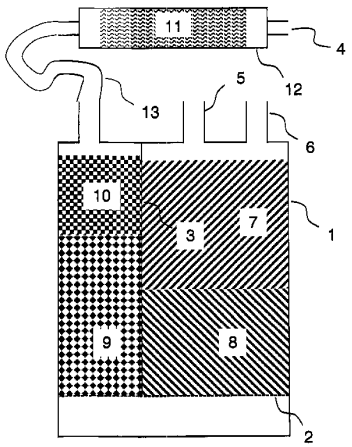
Primary Examiner—David A. Simmons
Assistant Examiner—Frank M. Lawrence
(74) *Attorney, Agent, or Firm*—Terry B. McDaniel; Daniel B. Reece, IV; Thomas A. Boshinski

(57) **ABSTRACT**

Disclosed is a method for sharply reducing diurnal breathing loss emissions from automotive evaporative emissions control systems by providing multiple layers, or stages, of adsorbents. On the fuel source-side of an emissions control system canister, high working capacity carbons are preferred in a first canister (adsorb) region. In subsequent canister region(s) on the vent-side, the preferred adsorbent should exhibit a flat or flattened adsorption isotherm on a volumetric basis and relatively lower capacity for high concentration vapors as compared with the fuel source-side adsorbent. Multiple approaches are described for attaining the preferred properties for the vent-side canister region. One approach is to use a filler and/or voidages as a volumetric diluent for flattening an adsorption isotherm. Another approach is to employ an adsorbent with the desired adsorption isotherm properties and to process it into an appropriate shape or form without necessarily requiring any special provision for dilution. The improved combination of high working capacity carbons on the fuel source-side and preferred lower working capacity adsorbent on the vent-side provides substantially lower diurnal breathing emissions without a significant loss in working capacity or increase in flow restriction compared with known adsorbents used in canister configurations for automotive emissions control systems.

30 Claims, 3 Drawing Sheets



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