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Transmitted h	erewith for filing under 35 USC 111 and 37 CFR 1.53
is the origin	al (nonprovisional) patent application of
Inventor(s):	Laurence H. Hiltzik, Jacek Z. Jagiello,
	Edward D. Tolles, and Roger S. Williams
Entitled: ME	THOD FOR REDUCING EMISSIONS FROM
EV	APORATIVE EMISSIONS CONTROL SYSTEMS
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If applicant has small entity status under 37 CFR 1.9 and 1.27, then divide total fee by 2, and enter amount here.

SMALL ENTITY TOTAL \$

- \underline{XXX} A check in the amount of \$ 920.00 is enclosed to cover the application filing fee.
- A check in the amount of \$_____is enclosed to cover the Assignment recordation fee.
- XXX The Commissioner is hereby authorized to charge or credit Deposit Account No. 23-1160 as described below. I have enclosed a duplicate copy of this sheet.

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XXX Charge any additional filing fees required under 37 CFR 1.16 and 1.17.

___ Charge the issue fee set in 37 CFR 1.18 at the mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).

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March 18, 2002 Date

Signat

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EXPRESS MAIL NO. EK902687082US

Case Docket No. CHR 2001-79

CERTIFICATE UNDER 37 C.F.R. 1.10(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to the Assistant Commissioner for Patents,

Washington, D. C. 20231, on <u>March 18, 2002</u>

Terry B. McDaniel Attorney for the Applicants Registration No. 28,444

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DISCLOSURE OF THE SPECIFICATION

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.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Case Jocket No. CHR 2001-79

Patent Application for

METHOD FOR REDUCING EMISSIONS FROM EVAPORATIVE EMISSIONS CONTROL SYSTEMS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a method for reducing emissions from evaporative control systems including activated carbon particulate-filled canisters and adsorptive monolithcontaining canisters, which monoliths include activated carbon, and to using said adsorbing canisters to remove volatile organic compounds, and other chemical agents from fluid streams. More particularly, this invention relates to using said vapor-adsorbing materials in hydrocarbon fuel consuming engines.

2. Description of Related Art (Including Information Disclosed Under 37 CFR 1.97 and 37 CFR 1.98)

(a) Standard Working Capacity Adsorbents

Evaporation of gasoline from motor vehicle fuel systems is a major potential source of hydrocarbon air pollution. The automotive industry is challenged to design engine components and systems to contain, as much as possible, the almost one billion gallons of gasoline evaporated from fuel systems each year in the United States alone. Such emissions can be controlled by canister systems that employ activated carbon to adsorb and hold the vapor that evaporates. Under certain modes of engine operation, the adsorbed hydrocarbon vapor is periodically removed from the carbon by drawing air through the canister and burning the desorbed vapor in the engine. The regenerated carbon is then ready to adsorb additional vapor. Under EPA mandate, such control systems have been employed in the U.S. for about 30 years,

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and during that time government regulations have gradually reduced the allowable emission levels for these systems. In response, improvements in the control systems have been largely focused on improving the capacity of the activated carbon to hold hydrocarbon vapor. For example, current canister systems, containing activated carbon of uniform capacity, are readily capable of capturing and releasing 100 grams of vapor during adsorption and air purge regeneration cycling. These canister systems also must have low flow restrictions in order to accommodate the bulk flow of displaced air and hydrocarbon vapor from the fuel tank during refueling. Improvements in activated carbons for automotive emission control systems are disclosed in U. S. Patent Nos.: 4,677,086; 5,204,310; 5,206,207; 5,250,491; 5,276,000; 5,304,527; 5,324,703; 5,416,056; 5,538,932; 5,691,270; 5,736,481; 5,736,485; 5,863,858; 5,914,294; 6,136,075; 6,171,373; 6,284,705.

A typical canister employed in a state of the art auto emission control system is shown in Figure 1. Canister 1 includes support screen 2, dividing wall 3, a vent port 4 to the atmosphere (for when the engine is off), a vapor source connection 5 (from the fuel tank), a vacuum purge connection 6 (for when the engine is running), and adsorbent material fill 7.

Other basic auto emission control system canisters are disclosed in U. S. Patent Nos.: 5,456,236; 5,456,237; 5,460,136; and 5,477,836.

Typical carbons for evaporative emission canisters are characterized by standard measurements of bed packing density ("apparent density," g/mL), equilibrium saturation capacity for 100% butane vapor ("butane activity," g/100g-carbon), and purgeability ("butane ratio"), specifically, the proportion of adsorbed butane from the saturation step which can be recovered from the carbon by an air purge step. The multiplicative product of these three properties yields a measure of the carbon's effective butane "working capacity" ("BWC", g/dL),

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measured by ASTM D5228-92, which has been established in the art as a good predictor of the canister working capacity for gasoline vapors. Carbons that excel for this application have high BWC, typically 9 to 15+ g/dL BWC, as a result of high saturation capacities on a volumetricbasis for butane (the product of density and butane activity), and high butane ratios (>0.85). In terms of isothermal equilibrium adsorption capacities across all vapor concentrations, these carbons characteristically have high incremental capacity as a function of increased vapor concentration (*i.e.*, isotherm curved upward on a semi-log graph). This isotherm upward curve reflects the high working capacity performance feature of these carbons, in that gasoline vapors are adsorbed in high quantity at high concentrations but readily released in high concentration to an air purge stream. In addition, these carbons tend to be granular (somewhat irregularly shaped) or cylindrical pellet, typically of a size just about 1-3 mm in diameter. It has been found that somewhat larger sizes hinder diffusional transport of vapors into and out of the carbon particle during dynamic adsorb and purge cycles. On the other hand, somewhat smaller size particles have unacceptably high flow restriction for displaced air and hydrocarbon vapors during refueling.

(b) Diurnal Breathing Loss (DBL) Requirements

Recently, regulations have been promulgated that require a change in the approach with respect to the way in which vapors must be controlled. Allowable emission levels from canisters would be reduced to such low levels that the primary source of emitted vapor, the fuel tank, is no longer the primary concern, as current conventional evaporative emission control appears to have achieved a high efficiency of removal. Rather, the concern now is actually the hydrocarbon left on the carbon adsorbent itself as a residual "heel" after the regeneration (purge) step. Such emissions typically occur when a vehicle has been parked and subjected to

diurnal temperature changes over a period of several days, commonly called "diurnal breathing losses." Now, the California Low Emission Vehicle Regulation makes it desirable for these diurnal breathing loss (DBL) emissions from the canister system to be below 10 mg ("PZEV") for a number of vehicles beginning with the 2003 model year and below 50 mg, typically below 20 mg, ("LEV-II") for a larger number of vehicles beginning with the 2004 model year. ("PZEV" and "LEV-II" are criteria of the California Low Emission Vehicle Regulation.)

While standard carbons used in the commercial canisters excel in terms of working capacity, these carbons are unable to meet DBL emission targets under normal canister operation. Furthermore, none of the standard measures of working capacity properties correlate with DBL emission performance. Nonetheless, one option for meeting emission targets is to significantly increase the volume of purge gas during regeneration in order to reduce the amount of residual hydrocarbon heel in the carbon bed and thereby reduce subsequent emissions. This strategy, however, has the drawback of complicating management of the fuel/air mixture to the engine during purge regeneration and tends to adversely affect tailpipe emissions, *i.e.*, moving or redefining the problem rather than solving it. (See U. S. Patent No. 4,894,072.)

Another option is to design the carbon bed so that there is a relatively low crosssectional area on the vent-side of the canister system (the first portion of the bed to encounter purge air), either by redesign of the existing canister dimensions or by the installation of a supplemental, auxiliary vent-side canister of appropriate dimensions. This alternative has the effect of locally reducing residual hydrocarbon heel by increasing the intensity of purge for that vent-side portion of the bed, thereby improving its ability to retain vapors that would otherwise be emitted from the canister system under diurnal breathing conditions. The drawback is that

there is a useful limit to which a portion of the bed can be elongated at reduced cross-sectional area without otherwise incurring excessive flow restriction by the canister system. In practice, this limit does not allow employing a sufficiently narrowed and elongated geometry to meet emission targets. (See U. S. Patent No. 5,957,114.)

Another option for increasing the purge efficiency of a fuel vapor/air mixture fraction adsorbed in the pores of the adsorbent material is suggested by the teachings of U. S. Patent Nos. 6,098,601 and 6,279,548 by providing a heating capability internal of the canister, or a section thereof, either to increase pressure in the vapor storage canister to expel hot vapor through the vapor/purge conduit back into the fuel tank where it condenses at the lower ambient temperature therein ('601) or to increase the purging efficiency of hydrocarbons from the heated adsorbent material and carry the purged fuel vapor to the induction system of an associated engine ('548). However, this increases the complexity of control system management, and there appears some inherent safety concerns in providing heating internal of a canister for trapping fuel vapors.

Thus, an acceptable remedy, which does not have drawbacks as the cited alternative approaches, is greatly desired. It is submitted that the invention disclosed and claimed herein provides the desired solution.

SUMMARY OF THE INVENTION

An invention is disclosed for sharply reducing diurnal breathing loss emissions from evaporative emissions canisters by the use of multiple layers, or stages, of adsorbents. On the fuel source-side of the canister, standard high working capacity carbons are preferred. On the vent-side, the preferred adsorbent volume exhibits a flat or flattened adsorbent isotherm on a volumetric basis in addition to certain characteristically desirable adsorptive properties across

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broad vapor concentrations, specifically relatively low incremental capacity at high concentration vapors compared with the fuel source-side adsorbent volume. Two approaches are described for attaining the preferred properties for the vent-side adsorbent volume. One approach is to use a filler and/or bed voidages as a volumetric diluent for flattening an isotherm. A second approach is to employ an adsorbent with the desired isotherm properties and to process it into an appropriate shape or form without necessarily requiring any special provision for dilution. Both such approaches provide a substantially lower emissions canister system without a significant loss in working capacity or an increase in flow restriction compared with prior art adsorbents used for automotive emissions control.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows, in cross-section, a prior art canister system.

Figure 2 shows, in cross-section, one embodiment of the invention canister comprising multiple adsorbents.

Figure 3 shows butane isotherm properties for different activated carbon adsorbents.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

The disclosed invention relates to the use of multiple beds (or layers, stages, or chambers) of adsorbent materials, which, in combination, significantly reduce DBL emissions while maintaining the high working capacity and low flow restriction properties of the canister system. (See Figure 2.) These adsorbents include activated carbon from a variety of raw materials, including wood, peat, coal, coconut, synthetic or natural polymer, and a variety of processes, including chemical and/or thermal activation, as well as inorganic adsorbents, including molecular sieves, porous alumina, pillared clays, zeolites, and porous silica, and organic adsorbents, including porous polymers. The adsorbents may be in granular, spherical,

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or pelletized cylindrical shapes, or may be extruded into special thin-walled cross-sectional shapes, such as hollow-cylinder, star, twisted spiral, asterisk, configured ribbons, or other shapes within the technical capabilities of the art. In shaping, inorganic and/or organic binders may be used. The adsorbents may be formed into a monolith or honeycomb part. The adsorbents may be incorporated into a canister as one or more layers, or separate chambers, or they may be inserted in the fluid stream flow as auxiliary canister beds.

One common feature for all of these approaches is to have a vent-side adsorbent with a relatively flat-shaped isotherm. This isotherm shape is important for reasons related to purge efficiency across the adsorbent bed depth. For an adsorbent with a flat adsorption isotherm, the concentration of hydrocarbon vapor in equilibrium with adsorbed hydrocarbon, by definition, decreases further as the adsorbed hydrocarbon is removed compared with an adsorbent with a more steeply sloped isotherm. Thus, when such a material is employed as an adsorbent volume on the vent-side region of a canister, purge is able to reduce the vapor concentration in the area of the purge inlet to a very low level. Since it is the vapor near the purge inlet that eventually emerges as bleed, decreasing this concentration reduces the bleed emission level. The degree of removal of adsorbed hydrocarbon during purge is determined by the difference between the concentration of hydrocarbon picked up in the purge gas and the concentration in equilibrium with the adsorbent at any point in the bed. Thus, adsorbent in the immediate vicinity of the purge inlet will be most thoroughly regenerated. At points deeper in the adsorbent bed, less hydrocarbon will be removed because the purge gas will already contain hydrocarbon removed from previous points in the bed. An adsorbent with a flatter adsorption isotherm will give up less vapor into the purge stream and this purge will then be more efficient in reducing vapor concentrations deeper into the bed. Therefore, for a given quantity of purge gas, it will be

possible to reduce the vapor concentration in a volume of adsorbent with a flat adsorption isotherm to a lower level than the concentration in the same volume of an adsorbent with a steep adsorption isotherm. Bleed emission from such a volume will therefore be lower when the adsorbent has a flatter adsorption isotherm.

A region within a canister containing particulate or in an adsorbent-containing monolith with the preferred adsorption isotherm properties for achieving low bleed emission levels will, however, have a relatively low adsorption working capacity compared to the activated carbons commonly used in automotive evaporative emission control. For example, the BWC of a low capicity adsorbent will be about 6 g/dL compared to the 9 g/dL to 15+ g/dL range as used in typical automotive carbons. Therefore, in order to maintain the required hydrocarbon capacity for normal emission control system operation, the low-bleed adsorbent will be used in a vent-side auxiliary region within the canister or outside the canister in combination with an fuel source-side region containing a volume of the high capacity carbon normally employed. When two different adsorbents are used, for example, system design will involve providing sufficient volume of the high capacity carbon in the main part, or fuel source-side, of an emission control canister to achieve the desired working capacity, and a sufficient volume of the low-bleed adsorbent to contain vapor emitted from the main bed to such an extent that such vapor does not materially affect the bleed emissions from the low-bleed adsorbent.

In the context of the invention, "monolith" is intended to include foams, woven and non-woven fibers, mats, blocks and bound aggregates of particulates.

It is notable that the emission of vapor from the main, high-capacity fuel source-side volume of adsorbent into the auxiliary lower capacity vent-side volume is significantly affected by the presence of that vent-side volume. During purge, a vent-side adsorbent volume having a

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flat adsorption isotherm will give up a relatively small hydrocarbon load into the purge gas. Therefore, the concentration of vapor carried by the purge gas will be low as it emerges from the low-bleed vent-side volume and enters the high-capacity, fuel source-side volume. This allows good regeneration of the high-capacity adsorbent in the vicinity of the junction of the two adsorbent volumes, and helps protect the vent-side volume from emissions from the fuel source-side region of the canister during diurnal breathing flow. Specifically, the greater regeneration efficiency of the fuel source-side volume reduces diurnal emissions by retarding the rate of bulk phase diffusion across the flow length of the canister system. Since bulk phase diffusion is a major mode of vapor transport during diurnal breathing conditions, by reducing the vapor concentration difference across the flow length of the canister system by enhanced regeneration, the redistribution of vapors within the canister system and subsequent emissions into the vent-side volume and out of the vent port are reduced.

Examples of adsorbents with isotherms having the preferred shape to provide low bleed performance are compared with standard canister-fill carbons (Westvaco Corporation's BAX 1100 and BAX 1500) in Figure 3. It is important to note that, as shown in this figure, the isotherm properties must be defined in terms of volumetric capacity. On this basis, the preferred low-bleed adsorbent portion will have an incremental n-butane capacity of less than about 35 g/liter between 5 and 50 volume percent n-butane vapor concentration.

While in some instances, known adsorbents may have the preferred properties for the vent-side, these adsorbents would not be expected to be useful in an evaporative canister. In some cases, these materials have low purgeability (butane ratio less than 0.85) and low working capacity (BWC less than 9 g/dL) as measured by the standard BWC test for qualifying canister carbons. Common wisdom and experience in the art associate low butane ratio with high

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residual hydrocarbon heel, which is the potential source for high emissions. Furthermore, low BWC adsorbents were not considered useful for inclusion into a canister system as working capacity for gasoline vapors would be assumed impaired, with no expectation that there would be a utility for reducing emissions. In fact, one preferred embodiment of this invention, lower capacity adsorbents have BWC values preferably below 8 g/dL, which is well below the 9-15+ g/dL BWC level normally deemed suitable for use in evaporative emission control canister systems. The preferred selection of these low BWC materials for inclusion into a canister system as a vent-side layer to produce low emissions was only realized once the dynamics within the adsorbent bed were realized (*i.e.*, the significance of low residual vapor concentration within the vent-side bed volume and the interactive effect that the vent-side bed volume has on the distribution and diffusion of vapor across the entire canister system during the diurnal breathing loss period).

Therefore, it has been found that the preferred vent-side adsorbent properties, in addition to a relatively low BWC, includes butane ratios between 0.40 and 0.98, which in total are substantially different properties compared with adsorbents previously conceived as useful for these canister systems.

The proposed alternative approaches described above are shown to be effective in canister bleed emission control in the following examples. One approach for preparing the vent-side adsorbent is to volumetrically dilute a high working capacity adsorbent so that its resulting isotherm is flattened on a volumetric basis. A second approach is to begin with an adsorbent that has the desired adsorption capacity and flat isotherm shape and process it into a shape or form, such as a pellet or honeycomb.

A particular preferred embodiment for a canister with multiple adsorbents is shown in Figure 2. Figure 2 shows a canister system comprising a primary canister body 1, a support screen 2, a dividing wall 3, a vent port 4 to the atmosphere, a vapor source connection 5, a vacuum purge connection 6, a fuel source-side region 7, vent-side canister regions 8 - 11 of varying low-capacities, supplemental canister body 12, and connecting hose 13 permitting fluid stream flow from the primary canister body 1 to the supplemental canister body 12. Additional embodiments, as discussed above, are also envisioned to be within the scope of the subject of the invention.

The desired results for the subject matter of the invention can be attained with a single vent-side uniform lower capacity adsorbent material as the subsequent adsorbent material. The option of multiples of lower capacity adsorbents with the desirable adsorptive properties across broad vapor concentrations is demonstrated merely as one embodiment.

The measures for gasoline working capacity (GWC) and emissions in the Table were derived from the Westvaco DBL test that uses a 2.1L canister. The pellet examples were tested as a 300 mL vent-side layer within the canister, with the 1800 mL of BAX 1500 pellets as the remaining canister fill. The honeycomb was tested as an auxiliary bed canister that was placed in-line with the 2.1L main canister of BAX 1500 pellets. For all examples, the canister system was uniformly first preconditioned by repetitive cycling of gasoline vapor adsorption and air purge (400 bed volumes air). This cycling generated the GWC value. Butane emissions were subsequently measured after a butane adsorption and an air purge step, specifically during a diurnal breathing loss period when the canister system was attached to a temperature-cycled fuel tank. The reported value is the 2nd day DBL emissions during an 11-hour period when the fuel tank was warmed and vapor-laden air was vented to the canister system and exhausted

from the vent-side adsorbent where the emissions were measured. The procedure employed for measuring DBL emissions has been described in *SAE Technical Paper 2001-01-0733*, titled "Impact and Control of Canister Bleed Emissions," by R. S. Williams and C. R. Clontz.

Example 1: Microsphere Filler Pellets. These 2 mm pellets are an example of the volumetric dilution method by adding a solid filler to the extrusion formulation. The pellets were prepared from an extrusion blend consisting of Westvaco SA-1500 powder (12.8 wt%), solid glass microsphere filler (79.7 wt% PQ Corporation A3000), bentonite clay (7.2 wt%), and phosphoric acid (0.3 wt%). The pellets were tumbled for four minutes, dried overnight at 105°C, and subsequently heat-treated in steam at 650°C for 15 minutes. An appropriate non-adsorbing filler reduces adsorption capacities across all vapor concentrations, resulting in a flattened adsorption isotherm ("Example 1" in Figure 3). Alternative methods for diluting the vent-side region are to co-mix adsorbent granules or pellets with inert filler particles of similar size, to form the extrusion paste into high voidage shapes such as hollow cylinders, asterisks, stars, or twisted, bent, or spiral ribbon pieces, or to place multiple thin layers of non-adsorbing particles or porous mats (e.g., foam), or simply trapped air space between layers of adsorbent.

Example 2: Ceramic-Bound Honeycomb. The 200 cpsi (cells per square inch) carboncontaining honeycomb is another example of the volumetric dilution method. The honeycomb in the Table was prepared according to the method described in U.S. Patent No. 5,914,294, which discloses forming an adsorptive monolith comprising the steps of (a) extruding an extrudable mixture through an extrusion die such that a monolith is formed having a shape wherein the monolith has at least one passage therethrough and the extrudable mixture comprises activated carbon, a ceramic forming material, a flux material, and water, (b) drying the extruded monolith, and (c) firing the dried monolith at a temperature and for a time period

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sufficient to react the ceramic forming material together and form a ceramic matrix. The extrudable mixture is capable of maintaining the shape of the monolith after extrusion and during drying of the monolith.

In this example, the extrusion formulation ingredients partially dilute the carbon adsorbent, and in addition, the adsorbent is further diluted by the open cell structure of the extruded part. These cells create more bed voidages within the part, compared with a similar bed volume of pellets (65 vol% voidages for the honeycomb versus 35 vol% for pellets or granules). The cell structure and high bed voidages have the added advantage of imposing minimal additional flow restriction compared with a bed of pellets, thereby allowing the honeycomb to be installed to the main canister as an add-on auxiliary device of greatly reduced cross-sectional area (see supplemental canister body **12** in Figure 2).

Example 3: Special Precursor Pellets: These 2 mm pellets were prepared by selecting the adsorbent to be extruded according to its intrinsic flat isotherm adsorption properties. In this example, there was no special provision for filler in the formulation or bed voidage dilution from the extruded shape. The ingredients for the extrusion blend producing the tested activated carbon pellets consisted of SX 1 grade activated carbon produced by NORIT (93.2 wt%) and sodium carboxymethyl cellulose binder system (6.8 wt%). The pellets were tumbled for four minutes, dried overnight at 105°C, and subsequently heat-treated in air at 150°C for three hours.

As noted above, the comparisons of these activated carbon containing materials, prepared as set forth in the examples, is shown in the following Table.

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TABLE

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Performance, Properties, and Formulations for Alternative Vent-Side Adsorbents

		Filled	Ceramic- Bound	Special Precursor	Prior Ar Working Cap	t: High acity Carbons			
	1	Pellet -	Honeycomb	Pellet					
	Fuel source-side BAX 1500								
	Volume:	1800 mL	2100 mL	1800 mL	1800 mL	1800 mL			
	Vent-Side Adsorbent Type:	"Ex. 1"	"Ex. 2"	"Ex. 3"	BAX 1100	BAX 1500			
	Vent-Side Mode:	Layer	Auxiliary Bed	Layer	Layer	Layer			
	Vent-Side Adsorbent Volume:	300 mL	200 mL 41mm diameter x 150 mm long, 200 cpsi	300 mL	300 mL	300 mL			
	Canister System Performance: West	vaco DBL Te	st		F	F			
	Gasoline Working Capacity, g:	138	144	132	143	139			
	2 nd Day DBL Emissions, mg-C ₄ :	29	10	13	88	221			
	Note:	(1)	(2)	(3)	(4)	(5)			
	Vent-Side Properties (6)								
	Incremental Adsorption At 25°C								
	5-50 vol% butane vapor. g/L:	24	16	18	52	80			
		24	10	10					
			A						
	Apparent Density, g/mL;	0.869	0.355	0.453	0.358	0.284			
	Butane Activity, g/100g:	7.0	13.1	18.5	39.0	64.7			
	BWC. g/dL:	5.7	4.0	5.0	11.9	16.0			
	Butane Ratio:	0.929	0.852	0.593	0.852	0.868			
_	(1) The DDI Tracker Assessed data for C	WC (400 h-1	(aluma nurga) and T	PL amissions (1	50 bed volume p	1 1rge): 2 11			
(1) "Two DBL Tests; Averaged data for GWC (400 bed volume purge) and DBL emissions (150 bed volume purge); 2.1L									

canister, 1500 mL fuel source-side chamber, 600 m times the vent-side cross-sectional area.
(2) Single DBL Test
(3) Average of three DBL Tests
(4) Average of three DBL Tests
(5) Average of six DBL Tests
(6) Density and BWC by ASTM standard techniques.

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The Table shows data for the three examples of these two approaches compared with vent-side layers containing high working capacity carbons, BAX 1100 and BAX 1500. Compared with the state of the art BAX carbons (the Figure 3), all three of the examples have significantly lower capacities for butane at high concentrations and considerably flatter isotherm curves.

As shown in the Table, the examples demonstrate reductions in emissions by factors of 3-22 over canisters consisting of only high working capacity carbons. There was either no loss or only a slight loss in GWC.

A further preferred embodiment of the invention method is presented in an evaporative emissions control system for a vehicle, the system comprising, in combination, a fuel tank for storing a volatile fuel, an engine having an air induction system and adapted to consume the fuel, a canister containing an initial volume of fuel vapor adsorbent material for temporarily adsorbing and storing fuel vapor from the tank, a conduit for conducting fuel vapor from the tank to a canister vapor inlet, a fuel vapor purge conduit from a canister purge outlet to the induction system of the engine, and a vent/air opening for venting the canister and for admission of air to the canister during operation of the engine induction system, wherein the canister defines a fuel vapor flow path via the canister vapor inlet through the initial volume of vapor adsorbent within a first region of the canister toward the vent/air opening, and an air flow path through a subsequent volume of adsorbent within a second region of the canister at the vent/air opening and the first region at the purge outlet, such that fuel vapor formed in the tank flows through the vapor inlet into the initial volume of adsorbent where it is adsorbed and, during operation of the engine induction system, ambient air flows in a path to and through the vent/air opening and along the air flow path in the canister through the

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initial volume and the purge outlet to the induction system of the engine, the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume, wherein at least one subsequent volume of vapor adsorbent material comprises a volume of 1% to 100% of the first volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25°C of greater than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane before routing the fluid stream through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an incremental is characterized by an incremental adsorption capacity at 25°C of less than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane before routing the fluid stream through at least one subsequent volume of vapor adsorbent material adsorption capacity at 25°C of less than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane.

This invention method certainly includes an embodiment wherein the second volume of vapor adsorbent material is located outside the canister in a separate subsequent canister, but in the flow path of the ambient air to the vent/air inlet and the first region.

This invention method includes an embodiment wherein the initial volume of vapor adsorbent material and the subsequent volume of vapor adsorbent material are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

The invention method includes an embodiment wherein the initial volume of vapor adsorbent material and the subsequent volume of vapor adsorbent material are inorganic

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materials selected from the group consisting of zeolites, porous silica, porous alumina, pillared clays, and molecular sieves.

The invention method includes an embodiment wherein the initial volume of vapor adsorbent material and the subsequent volume of vapor adsorbent material are porous polymers.

The invention method includes an embodiment wherein the subsequent volume of vapor adsorbent material exhibits adsorption capacities achieved by volumetric dilution.

The invention method further includes and embodiment wherein the volumetric dilution is accomplished by the addition of a non-adsorbing filler as a co-ingredient by an addition process selected from the group consisting of addition with the activated carbon raw material prior to activation, addition with the adsorbent before forming into a shaped particle or monolith, and a combination thereof.

The invention method further includes an embodiment wherein the volumetric dilution is accomplished by forming the adsorbent material into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, configured ribbons, and other shapes within the capabilities of the art.

The method claimed herein includes an embodiment wherein the volumetric dilution is accomplished by forming the adsorbent into a honeycomb or monolith shape.

The method claimed herein includes an embodiment wherein the volumetric dilution is accomplished by the use of inert spacer particles, foams, fibers, and screens external to the vent-side adsorbent particles and monoliths.

The method claimed herein includes an embodiment wherein the non-adsorbing filler is a solid after processing.

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Also, the method claimed herein includes an embodiment wherein the non-adsorbing filler is volatized or combusted to form voidages larger than 50Å width within the shaped particle or monolith.

The foregoing description relates to embodiments of the present invention, and changes and modifications may be made therein without departing from the scope of the invention as defined in the following claims.

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We claim:

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A method for reducing fuel vapor emissions in automotive evaporative emissions control systems comprising the steps of contacting the fuel vapor with an initial adsorbent volume having incremental adsorption capacity at 25°C of greater than 35 g nbutane/L between vapor concentrations of 5 vol% and 50 vol% n-butane and at least one subsequent adsorbent volume having an incremental adsorption capacity of less than 35 g nbutane/L between vapor concentrations of 5 vol% and 50 vol% n-butane.

2. The method of claim 1 comprising a single subsequent adsorbent volume.

3. The method of claim 1 comprising multiple subsequent adsorbent volumes.

4. The method of claim 2 wherein the initial adsorbent volume and the subsequent adsorbent volume are located within a single automotive evaporative emission control canister.

5. The method of claim 3 wherein the initial adsorbent volume and the subsequent adsorbent volumes are located within a single automotive evaporative emission control canister.

6. The method of claim 2 wherein the initial adsorbent volume and the subsequent adsorbent volume are located in separate canisters that are connected to permit sequential contact by the fuel vapor.

7. The method of claim 3 wherein the initial adsorbent volume and at least one subsequent adsorbent volume are located in separate canisters that are connected to permit sequential contact by the fuel vapor.

8. The method of claim 1 wherein the initial adsorbent volume and the subsequent adsorbent volume are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been

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activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

9. The method of claim 1 wherein the initial adsorbent volume and the subsequent adsorbent volume are inorganic materials selected from the group consisting of zeolites, porous silica, porous alumina, pillared clays, and molecular sieves.

10. The method of claim 1 wherein the initial adsorbent volume and the subsequent adsorbent volume are porous polymers.

11. The method of claim 1 wherein the subsequent adsorbent volume exhibits adsorption capacities achieved by volumetric dilution.

12. The method of claim 11 wherein the volumetric dilution is accomplished by the addition of a non-adsorbing filler as a co-ingredient by an addition process selected from the group consisting of addition with the activated carbon raw material prior to activation, addition with the adsorbent before forming into a shaped particle or monolith, and a combination thereof.

The method of claim 11 wherein the volumetric dilution is accomplished by 13. forming the adsorbent into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

14. The method of claim 11 wherein the volumetric dilution is accomplished by forming the adsorbent into a honeycomb or monolith shape.

15. The method of claim 11 wherein the volumetric dilution is accomplished by the use of inert spacer particles, trapped air spaces, foams, fibers, and screens external to the adsorbent.

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16. The method of claim 12 wherein the non-adsorbing filler is a solid after processing.

17. The method of claim 12 wherein the non-adsorbing filler is volatized or combusted to form voidages larger than 50Å width within the shaped particle or monolith.

In a method of reducing fuel vapor emissions in an automotive evaporative emissions control system comprising removing at least one volatile organic compound from a volatile organic compound-containing fuel vapor by routing the fuel vapor through a vapor adsorbent, the improvement comprising sequentially routing the fuel vapor through an initial adsorbent material-containing volume wherein the initial adsorbent material is characterized by an incremental adsorption capacity at 25°C of greater than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane before routing the fluid stream through at least one subsequent adsorbent-containing volume prior to venting to the atmosphere wherein the subsequent adsorbent-containing volume is characterized by an incremental adsorption capacity at 25°C of less than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% nbutane.

19. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are located in a single automotive evaporative emissions canister.

20. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are located in separate canisters that are connected to permit sequential contact by the fuel vapor.

21. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch,

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fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer and activated by chemical and/or thermal activation methods.

22. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are inorganic materials selected from the group consisting of zeolites, porous silica, and molecular sieves.

23. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are porous polymers.

24. The method of claim 18 wherein the subsequent adsorbent volume exhibits adsorption capacities achieved by volumetric dilution.

25. The method of claim 24 wherein the volumetric dilution is accomplished by the addition of a non-adsorbing filler as a co-ingredient by an addition process selected from the group consisting of addition with the activated carbon raw material prior to activation, addition with the adsorbent before forming into a shaped particle or monolith, and a combination thereof.

26. The method of claim 24 wherein the volumetric dilution is accomplished by forming the adsorbent into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

27. The method of claim 24 wherein the volumetric dilution is accomplished by forming the adsorbent into a honeycomb or monolith shape.

28. The method of claim 24 wherein the volumetric dilution is accomplished by the use of inert spacer particles, trapped air spaces, foams, fibers, and screens external to the adsorbent.

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29. The method of claim 25 wherein the non-adsorbing filler is a solid after processing.

30. The method of claim 25 wherein the non-adsorbing filler is volatized or combusted to form voidages larger than 50Å width within the shaped particle or monolith.

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Westvaco Corporation		FORMAL	CONFIRMATION NO. 3899

Westvaco Corporation 5255 Virginia Avenue P.O. Box 118005 Charleston, SC 29423-8005

Date Mailed: 04/24/2002

OC00000007944995

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
- A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(I) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

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SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is \$130 for a Large Entity

• \$130 Late oath or declaration Surcharge.

A copy of this notice <u>MUST</u> be returned with the reply.

Page 2 of 2

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Express Mail No. EF370311229US Case Docket No. CHR 2001-79 U. S. Serial (Non-Provisional) No. 10/100, 362 4AY 0 9 2002 MBINED DECLARATION, POWER OF ATTORNEY, TRADEM AND PETITION IN ORIGINAL APPLICATION

As a below named inventor, I hereby declare that: My residence, post office address and citizenship are as stated below next to my

name; that

I verily believe that I am an original first and joint inventor of the subject matter that is claimed, and for which a patent is sought on the invention entitled **Method for Reducing Emissions from Evaporative Emissions Control Systems** described and claimed in the specification, that I hereby state that I have reviewed and understand the contents of the specification, including the claims;

That I hereby claim the benefit under 35 U.S.C. 119(e) of the United States Provisional Application Serial No. 60/335,897 , filed November 21, 2001;

That I do not know and do not believe that this invention was ever known or used in the United States before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof for more than one year prior to this application, or in public use or on sale in the United States more than one year prior to this application, that this invention has not been patented or made the subject of an inventor's certificate in any country foreign to the United States prior to the date of this application on an application filed by me or my legal representatives or assigns more than twelve months before this application, that I acknowledge my duty to disclose information of which I am aware, which is material to patentability as defined in 37 Code of Federal Regulations § 1.56, and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent; and that no application for patent or inventor's certificate on this invention has been filed by me or my representatives or assigns in any country foreign to the United States.

And I hereby appoint --

Terry B. McDaniel Registration No. 28,444 MeadWestvaco Corporation 5255 Virginia Avenue Post Office Box 118005 Charleston, South Carolina 29423-8005 (WITH WHOM CORRESPONDENCE IS TO BE DIRECTED)

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Express Mail No. EF370311229US Case Docket No. CHR 2001-79 U. S. Serial (Non-Provisional) No. <u>10/100,362</u>

and Daniel B. Reece, IV, Registration No. 33,998, MeadWestvaco Corporation, 5255 Virginia Avenue, Post Office Box 118005, Charleston, South Carolina 29423-8005, and each of them, my attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. I further recognize and acknowledge that the true party in interest of the invention described and claimed herein is the assignee, Westvaco Corporation.

Wherefore I pray that Letters Patent be granted to us for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, declaration, power of attorney, and this petition.

I, the undersigned petitioner, declare further that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

FULL NAME OF SOLE OR FIRST INVENTOR INVENTOR'S SIGNATURE DATE 191 Broad Street, Charleston, SC 29401 United States RESIDENCE CITIZENSHIP 191 Broad Street, Charleston, SC 29401 POST OFFICE ADDRESS

 Jacek Z. Jagiello
 J/26/02

 FULL NAME OF SECOND JOINT INVENTOR INVENTOR'S SIGNATURE
 DA

6240 Old Point Road., Apt. # 41, Charleston, SC 29406 RESIDENCE

Laurence H. Hiltzik

United States CITIZENSHIP

6240 Old Point Road., Apt. # 41, Charleston, SC 29406 POST OFFICE ADDRESS

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Express Mail No. EF370311229US Case Docket No. CHR 2001-79 U. S. Serial (Non-Provisional) No. <u>10/100,362</u>

Edward D. Tolles Edward D. Tolly	3/26/07
FULL NAME OF THIRD JOINT INVENTOR INVENTOR'S SIGNATURE	DATE
2 Lampton Road, Charleston, SC 29407	United States
RESIDENCE	CITIZENSHIP
2 Lampton Road, Charleston, SC 29407	
POST OFFICE ADDRESS	
	, ,
Roger S. Williams Non Millens	3/28/02
FULL NAME OF FOURTH JOINT INVENTOR 'INVENTOR'S SIGNATUF	E DATE
900 Boyer Lane, Lexington, VA 24450	United States
RESIDENCE	CITIZENSHIP
900 Boyer Lane, Lexington, VA 24450	
POST OFFICE ADDRESS	

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75-10-02

EXPRESS MAIL NO. <u>EF370311229US</u> Case Docket No. <u>CHR 01-79</u> Serial No.: <u>10/100,362</u> File Date: <u>3/18/02</u>

CERTIFICATE UNDER 37 C.F.R. 1.10(a)

I hereby certify that this correspondence is being deposited with the United States

Postal Service as Express Mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, DC 20231, on <u>May 9, 2002</u>.

Terry B. McDaniel U Attorney for the Applicants Registration No. 28,444



EXPRESS MAIL NO. <u>EF370311229US</u> Case Docket No. <u>CHR 01-79</u> Serial No.: <u>10/100,362</u> File Date: <u>3/18/02</u> #3

CERTIFICATE UNDER 37 C.F.R. 1.10(a)

I hereby certify that this correspondence is being deposited with the United States

Postal Service as Express Mail in an envelope addressed to the Assistant Commissioner for

Patents, Washington, DC 20231, on May 9, 2002

Terry McDaniel

Attorney for the Applicants Registration No. 28,444

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Patent fees are subject to annual revision.	L	Examiner Na	ame				
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(\$) 130.00	<u></u>	Attorney Dod	cket No.	CHR	2001-7	9 -	
METHOD OF PAYMENT			FEE CA	LCULA	FION (cont	tinued)	
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SUBMITTED BY	and and and a second				Complete (if a	applicable)	ş
Name (Print/Type) Terry B. McDaniel	Re (Att	egistration No. torney/Agent)	28,444	Ī	Telephone 8	343-746-8	490
Signature	a p. 10	,					
					Date	May 9 ·	2002

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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Complete if Known Application Number Complete if Known	Express Mail No. EF370311229US Under the Paperwork Reduction Act of 1995, no persons are requi	U.S. Patent and T ired to respond to a collection of inf	PTC Approved for use through 10/31/2002. C rademark Office; U.S. DEPARTMENT O ormation unless it displays a valid OMB.	D/SB/17 (10-01) DMB 0651-0032 F COMMERCE
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	UBMITTED BY		Complete (if applicable)	
I erry B. McDaniel (Attomey/Agent) 28,444 Telephone 843-746-8490	Terry B. McDaniel	Registration No. (Attorney/Agent) 28,444	Telephone 843-746-84	90
ignature Date May 9, 2002	gnature Man All Runs d	: :	Date May 9 20	

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Page 1 of 2 \neq Z



Westvaco Corporation 5255 Virginia Avenue P.O. Box 118005 Charleston, SC 29423-8005

Date Mailed: 04/24/2002

OC000000007944995

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing. A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(I) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

Items Required To Avoid Processing Delays:

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is \$130 for a Large Entity

• \$130 Late oath or declaration Surcharge.

A copy of this notice <u>MUST</u> be returned with the reply.

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Page 2 of 2

Customer Service Center Initial Patent Examination Division (703) 308-1202 PART 1 - ATTORNEY/APPLICANT COPY

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MAY	0 9 2002 AB	Express Mail No.EF370311229US Case Docket No. CHR 2001-79 Serial No. 10/100,362	ΥA
	THE UNITED STATES PATENT AND TRAD	EMARK OFFICE	
Applicant:	Laurence H. Hiltzik, Jacek Z. Jagiello, Edward D. 7 Roger S. Williams	Folles, and	
Serial No.:	10/100/362	Group Art Unit: 1754	
Filed:	March 18, 2002 (with benefit of Provisional Ser. N	0. 60/335,897)	
For:	Method for Reducing Emissions from Evaporative	Emissions Control System	1. 1.
Examiner:			

Assistant Commissioner for Patents United States Patent and Trademark Office Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Sir:

The above-identified application, filed on March 18, 2002, is identical to the Provisional application Serial No. 60/335,897, filed via Express Mail with the U. S. Postal Service on November 21, 2001, with the intent to benefit from the filing date of said provisional application. A cross-reference in the instant application to said provisional application, however, was inadvertently omitted. This preliminary amendment is filed to provide such cross-referencing information.

IN THE SPECIFICATION:

Please amend the specification by adding, at page 1 after the title and before the heading, "BACKGROUND" the language as shown on the following page.

1

Page 50 of 141

Express Mail No.EF370311229US Case Docket No. CHR 2001-79 Serial No. 10/100,362

Clean Copy of Amended Specification Paragraph

This application claims the benefit of U.S. Provisional Application No. 60/335,897 filed

on November 21, 2001.

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Page 51 of 141

Express Mail No.EF370311229US Case Docket No. CHR 2001-79 Serial No. 10/100,362

REMARKS

The reasons for filing this preliminary amendment are stated above. A separate copy of the manner of making the amendment is attached.

If the Examiner believes, for any reason, that personal communication will expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

It is believed that no additional fees are due as a result of this preliminary amendment. If it is determined, however, that any additional fees are required, payment will be remitted upon receipt of the appropriate notification.

Respectfully submitted,

Terry B. McDaniel Attorney for the Applicant Registration No. 28,444

Attachment

Date:May 9, 2002 5255 Virginia Avenue Post Office Box 118005 Charleston, SC 29423-8005 Telephone (843) 746-8490

3

Express Mail No.EF370311229US Case Docket No. CHR 2001-79 Serial No. 10/100,362

Version with markings to show changes made to amended Specification

Please amend the heading at page 1 of the application as follows:

"IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application for

Method for Reducing Emissions

from Evaporative Emissions Control Systems

This application claims the benefit of U.S. Provisional Application No. 60/335,897 filed on November 21, 2001.

BACKGROUND OF THE INVENTION"

4

Sent By: CTC;

8437468494;

MeadWestvaco

Facsimile

Aug-14-02 1:45PM;

Page 1

MeadWestvaco Corporation Charleston Technical Center - Law Dept. 5255 Virginia Avenue P. O. Box 118005 Charleston, SC 29423-8005

DATE:

FROM:

August 14, 2002

Dominique Bataile

TO: COMPANY: FAX #:

USPTO 1-703-305-1086 Susan Harrison

SENDER'S PHONE #: (843) 746-8493 (843) 746-8494

SUBJECT:

SENDER'S FAX #:

Application No. 10/100,362 filed 3/18/02 Our Case Docket No. CHR 2001-79

TOTAL NUMBER OF PAGES: 10 (including cover sheet)

COMMENTS:

As per our conversation of today, I am submitting the following documents for your kind attention.

- Postcard stamped 5/9/02
- Certificate of Mailing dated 5/9/02
- Combined Declaration, Power of Attorney and Petition in Original Application
- Petition to Make Special under 37 CFR 1.102(c) for Restoration or Maintenance of Environmental Quality (MPEP 708.02, V)
- Declaration in Support of Petition to Make Special

I appreciate your assistance in this matter. Should you require any further information, please do not hesitate to contact me.

This entire transmission is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential, and exempt from disclosure under applicable law. If the reader of this message is not intended recipient, or the employee or agent responsible for delivering the message of the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone and return the original message to us at the above address via the U.S. Postal Service. You will be reimbursed for all reasonable expenses.



Page 55 of 141

Sent By: CTC;

Aug-14-02_1:45PM;

Page 3

EXPRESS MAIL NO. <u>EF37031122/US</u> Case Docket No. <u>CHR 01-79</u> Serial No.: <u>10/100,362</u> File Date: <u>3/18/02</u>

CERTIFICATE UNDER 37 C.F.R. 1.10(a)

I hereby certify that this correspondence is being deposited with the United States

Postal Service as Express Mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, DC 20231, on <u>May 9, 2002</u>.

Terfy H McDaniel

Attorney for the Applicants Registration No. 28,444

Aug-14-02 1:45PM;

Page 4

Express Mail No. EF370311229US Case Docket No. CHR 2001-79 U. S. Serial (Non-Provisional) No. 10/100, 362

COMBINED DECLARATION, POWER OF ATTORNEY, AND PETITION IN ORIGINAL APPLICATION

As a below named inventor, I hereby declare that: My residence, post office address and citizenship are as stated below next to my

name; that

Sent By; CTC;

I verily believe that I am an original first and joint inventor of the subject matter that is claimed, and for which a patent is sought on the invention entitled **Method for Reducing Emissions from Evaporative Emissions Control Systems** described and claimed in the specification, that I hereby state that I have reviewed and understand the contents of the specification, including the claims;

That I hereby claim the benefit under 35 U.S.C. 119(e) of the United States Provisional Application Serial No. 60/335,897 , filed November 21, 2001;

That I do not know and do not believe that this invention was ever known or used in the United States before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof for more than one year prior to this application, or in public use or on sale in the United States more than one year prior to this application, that this invention has not been patented or made the subject of an inventor's certificate in any country foreign to the United States prior to the date of this application on an application, that I acknowledge my duty to disclose information of which I am aware, which is material to patentability as defined in 37 Code of Federal Regulations § 1.56, and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent; and that no application for patent or inventor's certificate on this invention has been filed by me or my representatives or assigns in any country foreign to the United States.

And I hereby appoint --

Terry B. McDaniel Registration No. 28,444 MeadWestvaco Corporation 5255 Virginia Avenue Post Office Box 118005 Charleston, South Carolina 29423-8005 (WITH WHOM CORRESPONDENCE IS TO BE DIRECTED)

1

Aug-14-02 1:46PM;

Page 5

Express Mail No. EF370311229US Case Docket No. CHR 2001-79 U. S. Serial (Non-Provisional) No. <u>10/100, 362</u>

and Daniel B. Reece, IV, Registration No. 33,998, MeadWestvaco Corporation, 5255 Virginia Avenue, Post Office Box 118005, Charleston, South Carolina 29423-8005, and each of them, my attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. I further recognize and acknowledge that the true party in interest of the invention described and claimed herein is the assignee, Westvaco Corporation.

Wherefore I pray that Letters Patent be granted to us for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, declaration, power of attorney, and this petition.

I, the undersigned petitioner, declare further that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

2

Laurence H. Hiltzik

Sent By: CTC;

allen

United States

CITIZENSHIP

FULL NAME OF SOLE OR FIRST INVENTOR INVENTOR'S SIGNATURE

191 Broad Street, Charleston, SC 29401 RESIDENCE

191 Broad Street, Charleston, SC 29401 POST OFFICE ADDRESS

Jacek Z. Jagiello FULL NAME OF SECOND ENTOR INVENTOR'S SIGNATURE

126/02

United States

CITIZENSHIP

6240 Old Point Road., Apt. # 41, Charleston, SC 29406 RESIDENCE

6240 Old Point Road., Apt. # 41, Charleston, SC 29406 POST OFFICE ADDRESS

Sent By: CTC;

Aug-14-02 1:46PM;

Page 6/10

Express Mail No. EF370311229US Case Docket No. CHR 2001-79 U. S. Serial (Non-Provisional) No. <u>10/100,362</u>

Edward D. Tolles Since FULL NAME OF THIRD JOINT INVENTOR	NVENTOR'S SIGNATURE DAT	<u>/@</u> 2_ TE
2 Lampton Road, Charleston, SC 29407 RESIDENCE	United St. CITIZENSI	<u>ates</u> HIP
2 Lampton Road, Charleston, SC 29407 POST OFFICE ADDRESS		£4,
Roger S. Williams Re FULL NAME OF FOURTH JOINT INVENTOR	INVENTOR'S SIGNATURE DAT	
900 Boyer Lane, Lexington, VA 24450 RESIDENCE	United State CITIZENSI	s IIP
900 Boyer Lane, Lexington, VA 24450		

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Aug-14-02 1:46PM;

Page 7/10

Case Docket No. CHR 2001-79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Laurence H. Hiltzik, Jacek Z. Jagiello, Edward D. Tolles, and Roger S, Williams

Provisional Filed: Statutory Filed:

November 21, 2001 March 18, 2002 (referencing benefit of Provisional filing date)

Provisional Serial No. 60/335,897 10/100,362 Serial No.:

For:

Sent By: CTC;

"Method for Reducing Emissions from Evaporative Emissions Control Systems"

. . .

Examiner:

Assistant Commissioner for Patents U. S. Patent and Trademark Office Washington, D. C. 20231

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. §1.102(c) FOR RESTORATION OR MAINTENANCE OF ENVIRONMENTAL QUALITY (MPEP §708.02, V)

Dear Sir:

Applicants hereby petition to make this application special as being for an invention which will materially enhance the quality of the environment of mankind by contributing to the

(a)____restoration of one of the basic life-sustaining natural elements - air, water, or soil.

(b) X maintenance of one of the basic life-sustaining natural elements - air, water, or soil.

Aug-14-02 1:46PM;

Page 8/10

Case Docket No. CHR 2001-79

1. Accompanying material

Accompanying this petition is a declaration by

___applicant

X applicants' attorney

explaining how the invention materially contributes to category (a) or (b) set forth above.

2. Fee

Sent By: CTC;

In accordance with 37 C.F.R. §1.102(c), no fee is required for this petition.

Respectfully submitted,

Terry B. McDaniel Attorney for the Applicants Registration No. 28,444

May 9, 2002 5255 Virginia Avenue P. O. Box 118005 Charleston, South Carolina 29423-8005 tel (843) 746-8490 fax (843) 746-8494

Aug-14-02_1:47PM;

Page 9/10

Case Docket No. CHR 01-79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Laurence H. Hiltzik, Jacek Z. Jagiello, Edward D. Tolles, and Roger S. Williams

Provisional Filed: November 21, 2001 Statutory Filed: March 18, 2002 (referencing benefit of Provisional filing date)

Provisional Serial No. 60/335,897 Serial No.: 10/100,362

"Method for Reducing Emissions from Evaporative Emissions Control Systems"

Examiner:

For:

Sent By: CTC;

Assistant Commissioner for Patents U. S. Patent and Trademark Office Washington, D. C. 20231

DECLARATION IN SUPPORT OF PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102(c)

Dear Sir:

I, Terry B. McDaniel, Esq., declare as follows:

(1) I am an attorney-of-record for applicants in the above-identified application and, having drafted the specification and claims thereof, am fully aware of the nature of the invention thereof and of its significance and, on implementation, of its ability to materially enhance the quality of the environment and prevent health hazards (which is a basis for granting a petition to make special under MPEP 708.02, V).

(2) The instant application describes a method for sharply reducing diurnal breathing loss emissions from automotive evaporative emissions control systems by providing multiple layers, or stages, of adsorbents. Evaporation of gasoline from motor vehicle fuel systems is a major potential source of hydrocarbon air pollution. The automotive industry is challenged to design engine components and systems to contain, as much as possible, the almost one billion gallons of gasoline evaporated from fuel systems each year in the United States alone. Such emissions can be controlled by canister systems that employ activated carbon to adsorb and hold the vapor that evaporates. Recently, regulations have been promulgated that require a change in the approach with respect to the way in which vapors must be controlled. Allowable emission levels from canisters would be reduced to such low levels that the primary source of emitted

Aug-14-02_1:47PM;

Page 10/10

Case Docket No. CHR 01-79

vapor, the fuel tank, is no longer the regulatory focus, as current conventional evaporative emission control appears to have achieved a high efficiency of removal. Rather, the concern now is actually the hydrocarbon left on the carbon adsorbent itself as a residual "heel" after the regeneration (purge) step. Such emissions typically occur when a vehicle has been parked and subjected to diurnal temperature changes over a period of several days, commonly called "diurnal breathing losses." The invention 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.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC § 1001 and that such false statements may jeopardize the validity of this document and the application to which it relates.

Signed at Charleston, South Carolina, this 9th day of May, 2002.

Terry B. McDaniel

Attorney for the Applicants Registration No. 28,444

5255 Virginia Avenue P. O. Box 118005 Charleston, SC 29423-8005 Tel (843) 746-8490 Fax (843) 746-8494



UNITED STATES PATENT and TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE WASHINGTON, D.C. 20231 WWW.USPTO.GOV

> UR PAPER NO.6

SEP 20 2002

In re Application of Laurence H. Hiltzik et al. Serial No. 10/100,362 Filed: March 18, 2002 For: METHOD FOR REDUCING EMISSIONS FROM EVAPORATIVE EMISSIONS CONTROL SYSTEMS

DECISION ON PETITION

UNDER 708.02, V

This is in response to the petition filed May 09, 2002, requesting that the above-identified application be granted Special Status under Sections 708.02 (V) of the MPEP and 37 CFR 1.102(c).

The petition has been considered and found to comply with the requirements set forth under the above-noted section. Accordingly the petition is **GRANTED**.

Rebard V. Fisher

Richard V. Fisher, Director Technology Center 1700 Chemical and Materials Engineering

Westvaco Corporation 5255 Virginia Avenue P.O. Box 118005 Charleston, SC 29423-8005



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Westvaco Corpor	ration			EXAMIN	ER
5255 Virginia Ave P.O. Box 118005	nue			LAWRENCE JR	, FRANK M
Charleston, SC 294	423-8005			ART UNIT	CLASS-SUBCLASS
				1724	095-146000
				DATE MAILED: 10/08/2002	
APPLICATION NO.	FILING DATE	FIRST NA	MED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
10/100,362	03/18/2002	Laurer	ce H. Hiltzik	CHR 2001-79	3800
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II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

□ Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

Page 1 of 4

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

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		PART B -	FEE(S) TRA	NSMITTAL)	
Complete and send	l this form, togethe	r with applicable fe	e(s), to: <u>Mail</u> Fax	Box ISSUE I Commission Washington, (703)746-400	FEE er for Patents D.C. 20231 0	s.
INSTRUCTIONS: This fo appropriate. All further con indicated unless corrected maintenance fee notification	rm should be used for respondence including t below or directed otherv 18.	transmitting the ISSUE he Patent, advance order, vise in Block 1, by (a) sp	FEE and PUBLIC s and notification pecifying a new c	CATION FEE (if of maintenance for orrespondence ad	required). Blocks 1 through 4 fees will be mailed to the curre dress; and/or (b) indicating a se	should be completed when ent correspondence address a eparate "FEE ADDRESS" for
CURRENT CORRESPONDENC 7: Westvaco Corpor	E ADDRESS (Note: Legibly ma 590 10/08/200 ation	rk-up with any corrections or use 2	Block 1)	Note: A certific Fee(s) Transm accompanying formal drawing	ate of mailing can only be used iittal. This certificate cannol papers. Each additional paper , must have its own certificate o	for domestic mailings of the be used for any other such as an assignment of f mailing or transmission.
5255 Virginia Ave P.O. Box 118005 Charleston, SC 294	nue 123-8005	-		l hereby certif United States P envelope addre transmitted to tl	Certificate of Mailing or Tra y that this Fee(s) Transmittal ostal Service with sufficient pos ssed to the Box Issue Fee addre USPTO, on the date indicated	ansmission is being deposited with the stage for first class mail in an ses above, or being facsimile below.
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						(Signature (Date
APPLICATION NO.	FILING DATE	FIR	ST NAMED INVEN	TOR	ATTORNEY DOCKET NO	. CONFIRMATION NO.
APPLN. TYPE	SMALL ENTITY NO	ISSUE FEE \$1280	PUBL	ICATION FEE	TOTAL FEE(S) DUE	DATE DUE
					91300	01/08/2005
LAWRENCE JF	R, FRANK M	1724	095-1460	DO		
 "Fee Address" indicati PTO/SB/47; Rev 03-02 of Number is required. ASSIGNEE NAME AND PLEASE NOTE: Unless a been previously submitted (A) NAME OF ASSIGNE 	on (or "Fee Address" Inc or more recent) attached. RESIDENCE DATA T n assignee is identified t to the USPTO or is bein E	ication form Use of a Customer O BE PRINTED ON THE below, no assignee data w g submitted under separate (B) RE	attorney or ag registered pater is listed, no nan PATENT (print of vill appear on the e cover. Completio SIDENCE: (CIT	ent) and the nar at attorneys or age ne will be printed. Tr type) patent. Inclusion of on of this form is h Y and STATE OR	nes of up to 2 2 ents. If no name 3 of assignee data is only appropr NOT a substitute for filing an ass COUNTRY)	iate when an assignment has signment.
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Commissioner for Patents is	requested to apply the Is	sue Fee and Publication F	ee (if any) or to re	-apply any previo	ously paid issue fee to the applic	ation identified above.
Authorized Signature)		(Date)				
NOTE; The Issue Fee and other than the applicant; interest as shown by the re-	d Publication Fee (if rec a registered attorney or cords of the United State	uired) will not be accep agent; or the assignee o s Patent and Trademark O	ted from anyone or other party in ffice.			
This collection of informa obtain or retain a benefit application. Confidentiality estimated to take 12 minui completed application forr case. Any comments on suggestions for reducing t Patent and Trademark Off NOT SEND FEES OR Commissioner for Patents,	tion is required by 37 C by the public which is t v is governed by 35 U.S. es to complete, includin n to the USPTO. Time the amount of time yc his burden, should be se ice, U.S. Department of COMPLETED FORM Washington, DC 20231.	FR 1.311. The informati- o file (and by the USPT) C. 122 and 37 CFR 1.14.7 gathering, preparing, an will vary depending upo- u require to complete t int to the Chief Informati Commerce, Washington, IS TO THIS ADDRES	on is required to O to process) an This collection is ad submitting the on the individual his form and/or ion Officer, U.S. D.C. 20231, DO SS. SEND TO:			
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	ed States Patent	AND TRADEMARK OFFICE United S Address. C W W	STATES DEPARTMENT OF CO tates Patent and Trademark Of OMMISSIONER OF PATENTS AND 7 shington, DC. 20231 www.uspto.gov	MMERCE fice FRADEMARKS
APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/100,362	03/18/2002	Laurence H. Hiltzik	CHR 2001-79	3899
75	90 10/08/2002		EXAMIN	ER
Westvaco Corpor 5255 Virginia Aver	ation		LAWRENCE JR	, FRANK M
P.O. Box 118005	· · · ·		ART UNIT	PAPER NUMBER
Charleston, SC 294	23-8005	- -	1724	
		D	ATE MAILED: 10/08/2002	

Eman

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The patent term adjustment to date is 0 days. If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the term adjustment will be 0 days.

If a continued prosecution application (CPA) was filed in the above-identified application, the filing date that determines patent term adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system. (http://pair.uspto.gov)

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

Page 3 of 4



Notice of Possible Fee Increase on October 1, 2002

If a reply to a "Notice of Allowance and Fee(s) Due" is filed in the Office on or after October 1, 2002, then the amount due may be higher than that set forth in the "Notice of Allowance and Fee(s) Due" since there may be an increase in fees effective on October 1, 2002. See Revision of Patent and Trademark Fees for Fiscal Year 2003; Notice of Proposed Rulemaking, 67 Fed. Reg. 30634, 30636 (May 7, 2002). Although a change to the amount of the publication fee is not currently proposed for October 2002, if the issue fee or publication fee is to be paid on or after October 1, 2002, applicant should check the USPTO web site for the current fees before submitting the payment. The USPTO Internet address for the fee schedule is: http://www.uspto.gov/main/howtofees.htm.

If the issue fee paid is the amount shown on the "Notice of Allowance and Fee(s) Due," but not the correct amount in view of any fee increase, a "Notice to Pay Balance of Issue Fee" will be mailed to applicant. In order to avoid processing delays associated with mailing of a "Notice to Pay Balance of Issue Fee," if the response to the Notice of Allowance and Fee(s) due form is to be filed on or after October 1, 2002 (or mailed with a certificate of mailing on or after October 1, 2002), the issue fee paid should be the fee that is required at the time the fee is paid. If the issue fee was previously paid, and the response to the "Notice of Allowance and Fee(s) Due" includes a request to apply a previously-paid issue fee to the issue fee now due, then the difference between the issue fee amount at the time the response is filed and the previously paid issue fee should be paid. See Manual of Patent Examining Procedure, Section 1308.01 (Eighth Edition, August 2001).

Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

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PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

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Notice of Allowability	10/100,362	HILTZIK ET AL.	· · · · · · · · · · · · · · · · · · ·
	Examiner	Art Unit	
	Frank M. Lawrence	1724	
All claims being allowable, PROSECUTION ON THE MERITS erewith (or previously mailed), a Notice of Allowance (PTOL-IOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT of the Office or upon petition by the applicant. See 37 CFR 1. . ○ This communication is responsive to the application file . ○ The allowed claim(s) is/are 1-30. . ○ .	IS (OR REMAINS) CLOSED 85) or other appropriate comr T RIGHTS. This application is 313 and MPEP 1308. and MPEP 1308. and March 18, 2002. the Examiner. under 35 U.S.C. § 119(a)-(d)	in this application. If not inc nunication will be mailed in c subject to withdrawal from i or (f).	luded lue course. THIS ssue at the initiative
a) [] All b) [] Some* c) [] None of the:			
1. Certified copies of the priority documents h	ave been received.		
2. Certified copies of the priority documents h	ave been received in Applicat	ion No	
3. [_] Copies of the certified copies of the priority International Bureau (PCT Rule 17.2(a))	documents have been receiv).	ed in this national stage app	lication from the
* Certified copies not received:			
Acknowledgment is made of a claim for domestic priorit	y under 35 U.S.C. § 119(e) (to	a provisional application).	
(a) I he translation of the foreign language provision	al application has been receiv	ed. Vor 121	
elow. Failure to timely comply will result in ABANDONMENT A SUBSTITUTE OATH OR DECLARATION must be su NFORMAL PATENT APPLICATION (PTO-152) which gives r	of this application. THIS TH ubmitted. Note the attached E reason(s) why the oath or decl	REE-MONTH PERIOD IS N XAMINER'S AMENDMENT aration is deficient.	or NOTICE OF
 CORRECTED DRAWINGS must be submitted. (a) including changes required by the Notice of Drafts (a) hereto or 2) (b) including changes required by the proposed drawi (c) including changes required by the attached Exami 	person's Patent Drawing Revi ng correction filed, wh ner's Amendment / Comment	ew (PTO-948) attached ich has been approved by th or in the Office action of Pap	ne Examiner. per No
Identifying indicia such as the application number (see 37 CF of each sheet. The drawings should be filed as a separate pa	R 1.84(c)) should be written on per with a transmittal letter add	the drawings in the top margi Iressed to the Official Draftsp	n (not the back) erson.
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 Notice of References Cited (PTO-892) Notice of Draftperson's Patent Drawing Review (PTO-948 Information Disclosure Statements (PTO-1449), Paper Notice Examiner's Comment Regarding Requirement for Deposition of Biological Material 	2	of Informal Patent Applicatio w Summary (PTO-413), Pa her's Amendment/Comment her's Statement of Reasons	on (PTO-152) per No for Allowance
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J.S. Patent and Trademark Office PTO-37 (Rev. 04-01)	Notice of Allowability		Part of Paper No. 7

Application/Control Number: 10/100,362 Art Unit: 1724

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-30 are allowed.

2. The following is an examiner's statement of reasons for allowance: A method for reducing fuel vapor emissions in automotive evaporative emissions control systems, comprising contacting the fuel vapor with an initial adsorbent volume having incremental adsorption capacity at 25° C of greater than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane and at least one subsequent adsorbent volume having an incremental adsorption capacity of less than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane, is not taught, disclosed or suggested in a single reference or a combination of references in the prior art of record. The closest prior art discloses evaporative emission prevention systems comprising different sorbents for reducing diurnal breathing but fails to suggest using sorbents having the butane working capacities specified above. Note that a "PRIOR ART" label has been added to figure 1 because only that which is known is depicted.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional references listed on the attached PTO-892 form, including those listed

Page 2

Application/Control Number: 10/100,362 Art Unit: 1724

in the instant specification, disclose prepared sorbent materials and evaporative emission systems having different sorbent chambers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 703-305-0585. The examiner can normally be reached on Mon-Thurs 7:30-5:00; alternate Fridays 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Simmons can be reached on 703-308-1972. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

 \mathbf{fl} September 24, 2002

David A. Simmons Supervisory Patent Examiner Technology Center 1700

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| * | А | US-5,207,808 | 05-199ุ3 | Haruta | et al. | | | | Alt | 123/519 |
| * | В | US-5,337,721 | 08-1994 | Kasuya | a et al. | | | | | 123/519 |
| * | С | US-5,408,976 | 04-1995 | Reddy, | Sam R. | 4 | | | 1 M | 123/198D |
| * | D | US-5,456,236 | 10-1995 | Wakas | hiro et al. | | | | | 123/519 |
| * | Е | US-5,564,398 | 10-1996 | Maeda | et al. | | | | | 123/519 |
| * | F | US-5,914,457 | 06-1999 | Itakura | et al. | | | 2 | | 123/519 |
| * | G | US-6,136,075 | 10-2000 | Bragg | ət al. | | *********** | | | 55/519 |
| * | Η | US-6,279,548 | 08-2001 | Reddy, | Şam Raghu | ma | , | | | 123/519 |
| * | 1 | US-4,677,086 | 06-1987 | McCue | et al. | | -, -, <u>-, -, -, -, -, -</u> , -, -, -, -, -, -, -, -, -, -, -, -, -, | | | 123/519 |
| * | J | US-5,204,310 | 04-1993 | Tolles | et al. | ****** | | | | 123/519 |
| * | ĸ | US-5,206,207 | 04-1993 | Tolles, | Edward D. | | | | - | 502/423 |
| * | L | US-5,250,491 | 10-1993 | Yan, Zl | niquan Q. | | | ****** | | 264/117 |
| * | М | US-5,276,000 | 01-1994 | Matthe | ws et al. | ······ | | | 1 | 502/424 |
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DERWENT-ACC-NO: 2002-544937 DERWENT-WEEK: 200258 COPYRIGHT 1999 DERWENT INFORMATION LTD

TITLE: Diurnal breathing loss control canister module system and constructing method thereof

INVENTOR: OH, W S

PATENT-ASSIGNEE: KOREA FUEL TECH CORP[KOFUN]

PRIORITY-DATA: 2000KR-0046045 (August 9, 2000)

PATENT-FAMILY: PUB-NO PUB-DATE LANGUAGE PAGES MAIN-IPC KR 2002012826 February 20, 2002 N/A 001 B60K 015/10 A

APPLICATION-DATA: PUB-NO APPL-DESCRIPTOR APPL-NO APPL-DATE KR2002012826A N/A 2000KR-0046045 August 9, 2000

INT-CL (IPC): B60K015/10

ABSTRACTED-PUB-NO: KR2002012826A BASIC-ABSTRACT: NOVELTY - A constructing method of a DBL(Diurnal Breathing Loss) control canister module system is provided to cut down expenses and improve fuel efficiency by regulating DBL and preventing evaporative gas of fuel corresponding to exhaust gas regulation.

09/23/2002, EAST Version: 1.03.0002

DETAILED DESCRIPTION - Hydrocarbon is discharged through a large canister(1), and collected to a DBL control canister(2). Activated carbon is filled in the DBL control canister with the volume of 250-1000CC. A canister close valve(3) is connected between the DBL control canister and an air filter(4) to detect leakage of gas, and air is purified with the air The DBL control filter. canister is fixed with a bolt and a nut(17), or integrally formed in the large canister to prevent from being separated against impact and vibration. Gas is evaporated with increasing temperature of fuel in a tank, and evaporative gas is adsorbed in activated carbon of the canister. Evaporative hydrocarbon is adsorbed in the activated carbon of the DBL control canister, and burned with recycling to the engine by negative pressure of the engine. Fuel efficiency is improved with regulating exhaust gas.

CHOSEN-DRAWING: Dwg.1/10

TITLE-TERMS: DIURNAL BREATH LOSS CONTROL CANISTER MODULE SYSTEM CONSTRUCTION METHOD

DERWENT-CLASS: Q13

09/23/2002, EAST Version: 1.03.0002

	-	Notice of Reference	s Cited	,	Application/C 10/100,362	ontrol No.	Applicant(s)/ Reexaminati HILTZIK ET	Patent Under on AL.
					Examiner Frank M Law	rence	Art Unit	Page 2 of 3
			<u></u>	U.S. PATENT DOCUMENTS				·
Τ		Document Number	Date			Name		Classification
╈	Α	US-5.304.527	04-1994	Dimitri.	Mitchell S.	· · · ·		502/416
+	В	US-5,324,703	06-1994	McCue	et al.			502/424
	c	US-5,416,056	05-1995	Baker,	Frederick S.	¹ 14		502/425
+	Ď	US-5,538,932	07-1996	Yan et	al.			502/424
-	E	US-5,691,270	11-1997	Miller,	James R.			502/174
	F	US-5,736,481	04-1998	Miller,	James R.			502/174
	G	US-5,736,485	04-1998	Miller,	James R.			502/174
:	н	US-5,863,858	01-1999	Miller e	et al.			502/180
	I	US-5,914,294	06-1999	Park e	t al.			501/100
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	Ŕ	US-6,171,373	01-2001	Park e	t al.	· · · · · · · · · · · · · · · · · · ·		95/138
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Sent By: CTC; 8437468494; Dec-10-02 4:36PM; Page Case Docket No. CHR 2001-79 Serial No. 10/100,362 Certificate of Transmission under 37 CFR 1.8 I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office On _ December 10, 2002. Date Detarn Motch 8 Terry B. McDaniel Attorney for the Applicants Registration No. 28,444 Typod or printed name of person signing Certificate 91 Note: Each paper must have its own certificate of transmission, or this certificate must identify each submitted paper. RECEIVED TC 72003 TC 72003 Fee Transmittal Form PTO/SB/17 Petition to Withdraw from Issue Under 37 CFR 1.313 (c)(2) Declaration in Support of Petition Request for Continued Examination (RCE) Transmittal form Information Disclosure Statement PTO-1449 Copies of Cited Art Total 140 pages

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Page 3

Case Docket No. CHR 2001-79

Group Art Unit: 1724

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: L. H. Hiltzik, J. Z. Jagiello, E. D. Tolles, R. S. Williams

Filed: March 18, 2002

Serial No.: 10/100,362

For: "Method For Reducing Emissions From Evaporative Emission Control Systems"

Examiner: Frank M. Lawrence

Assistant Commissioner for Patents U. S. Patent and Trademark Office Washington, D. C. 20231

PETITION FOR WITHDRAWAL FROM ISSUE UNDER 37 C.F.R. §1.313(c)(2)

Dear Sir:

Applicants hereby petition to have the above-described patent application withdrawn from issue under 37 C.F.R. 1.313(c)(2).

1. Accompanying material

Accompanying this petition is a declaration by

___applicant

X applicants' attorney

showing good and sufficient reasons why withdrawal of the application from issue is necessary.



Dec-10-02 4:37PM;

Page 4

Case Docket No. CHR 2001-79 Serial No. 10/100,362

2. Fee

Sent By: CTC;

In accordance with 37 C.F.R. $\S1.313$, the fee set forth in 37 C.F.R. \$1.17(h) is hereby submitted with this petition, as permission to authorize a charge to Deposit Account 23-1160.

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Respectfully submitted,

Terry E. McDaniel Attorney for the Applicants Registration No. 28,444

Attachments December 10, 2002 5525 Virginia Avenue P. O. Box 118005 Charleston, South Carolina 29423-8005 Phone (843) 740-2311 FAX (843) 740-2335

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Case Docket No. CHR 2001-79

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: L. H. Hiltzik, J. Z. Jagiello, E. D. Tolles, R. S. Williams

Serial No. 10/100,362

Filed:

For:

"Method For Reducing Emissions From Evaporative Emission Control Systems"

Examiner:

Assistant Commissioner for Patents U. S. Patent and Trademark Office Washington, D. C. 20231

DECLARATION IN SUPPORT OF

PETITION TO WITHDRAW FROM ISSUE UNDER 37 C.F.R. § 1.313(c)(2)

Dear Sir:

I, Terry B. McDaniel, Esq., declare as follows:

March 18, 2002

Frank M. Lawrence

(1) I am an attorney-of-record for the applicants in the above-identified application and, having drafted the specification and claims thereof. I am fully aware of the subject matter of the invention thereof and of the field of invention in which it resides. Upon my receipt of the results of the prior art search conducted by the European Patent Office (EPO) in conjunction with the PTC filing based on the instant application, I was made aware for the first time of prior art references that appear to be material and relevant to the examination of the instant application, but have not been examined (which is a basis for this petition to have this application withdrawn from issue under 37 C.F.R. $\S1.313(c)(2)$).

(2) The instant application describes a method for sharply reducing diurnal breathing loss emissions from automotive evaporative emissions canisters by the use of multiple layers, or stages, of adsorbents. On October 8, 2002, the Examiner mailed the notice of allowance of claims 1-30 responsive to the filing of the instant application. The issue fee was timely paid on November 11, 2002. To date, the application has not issued as a U.S. Patent.

In view of the facts set forth, the undersigned attorney-of-record in this application petitions for withdrawal of the application from issue for consideration of a request for continued examination in compliance with 37 C.F.R. §1.114(c). An Information Disclosure Statement

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listing the newly discovered references, with some discussion to distinguish from the invention disclosed and claimed in the instant application, is also enclosed for consideration.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC § 1001 and that such false statements may jeopardize the validity of this document and the application to which it relates.

Signed at Charleston, South Carolina, this 10th day of December, 2002.

Térry B. McDani

Attorney for the Applicants Registration No. 28,444

Enclosure

5255 Virginia Avenue P. O. Box 118005 Charleston, SC 29423-8005 Tel (843) 740-2311 Fax (843) 740-2335

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REQUEST	Serial No:	10/100 262
FOR	Filing Date:	Morph 1B, 2004
CONTINUED EXAMINATION (RC)	E) First Named Inventor	
TRANSMITTAL	Group Art I Init	1724
35 USC 132(b) effective May 29, 2000	Examiner	E M Lourossa -
	Attorney Docket No:	CHP 2004 70
Inis is a Request for Continued Examination (I identified application.	RCE) under 37 C.F.R.	§ 1.114 for the above
 Submission required under 37 C.F.R. § 1.114 Previously submitted Consider the amendment(s)/replinit Consider the arguments in the April 10 Other: Other: Enclosed Affidavit(s)/Declaration(s) in supplied Information Disclosure Statement Other: Petition to Withdraw from 	y under 37 C.F.R. § 1.16 fil opeal Brief/Reply Brief filed port of Petition to Withd t (IDS) PTO-1449 and cop Issue	ed on I on <u>raw From Issue</u> ies of references
 Miscellaneous a. Suspension of action on the above-identif 1.103(c) for a period of 37 C.F.R. § 1.17(i) required.) b. Other: 	ied application is requested suspension shall not exce	d under 37 C.F.R. § ed 3 months; fee under
 3. Fees a. ∑ The Director is hereby authorized to charge <u>Deposit Account No. 23-1160</u>. i. ☐ RCE fee required under 37 C.F.R. § 1.13 ii. ☐ Extension of time fee (37 C.F.R. § 1.13) iii. ☐ Other: b. ☐ Check in the amount of \$ is enclose. c. ☐ Payment is made by credit card (Form PT d. ∑ Fee Transmittal Form authorizing to charge. 	e the following fees, or creat 17(e), 6 and 1.17). ed. FO-2038 enclosed), ge Indicated fees (PTO/SB	dit any overpayment to /17 enclosed)
SIGNATURE OF APPLICANT, ATTO	RNEY OR AGENT REQU	IRED
Signature: Jun Bu Bu Could D	ate: December 10, 2002	28,444
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Case Docket No. CHR 2001-79 Serial No. 10/100,362

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: L. H. Hiltzik, J. Z. Jagiello, E. D. Tolles, R. S. Williams Serial No .: 10/100,362 Filed:

Group Art Unit: 1724

03/18/02

Method For Reducing Emissions From Evaporative Emission Control Systems For:

Examiner: Frank M. Lawrence Jr.

Honorable Commissioner of Patents and Trademarks Washington, DC 20231

INFORMATION DISCLOSURE STATEMENT

Dear Sir:

Under the provisions of 37 C.F.R.§§ 1.56, 1.97, and 1.98, applicant submits herewith copies of publication that the Office may wish to consider in continued examination of the subject application. The publications are listed on the attached form PTO-1449.

I hereby certify that each item of information contained in this information disclosure statement was first cited in a communication, dated November 19, 2002, from a foreign patent office in a counterpart foreign application and first came to the attention of the undersigned attorney on December 2, 2002, after being forwarded from the corporate receiving office for such correspondence in Atlanta, GA. The Commissioner is hereby authorized to charge the fee set forth in 37 C.F.R. §1.17 (p) in the amount of \$180.00, which is listed on the enclosed Fee Transmittal form.

Allowability of the claims of the instant application was based on the examiner's finding that "the closest prior art discloses evaporative emission control systems comprising different

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sorbents for reducing diurnal breathing but fails to suggest using sorbents having the (specified) butane working capacities."

Of the six documents cited in the attached International Search Report, describing canisters with layers or compartments containing different adsorbents or containing heat absorbing or heat generating media, three are considered to define the general state of the art but are "not considered to be of particular relevance." These are WO 92 01585 A to British Petroleum Co., U.S. Patent No. 5,460,136 to Yamazaki et al., and U.S. Patent No. 6,279,548 to Reddy.

WO 92 01585 A describes the use of two different adsorbents to improve canister working capacity. The first adsorbent is conventional activated carbon, and the second is selected from a group of adsorbent organic polymers. A claimed feature is that purge gas first enters the activated carbon component. The disclosure of the instant application, on the other hand, teaches that for bleed emission control the purge gas must first enter the special adsorbent, not the conventional activated carbon component. The invention claimed is consistent with such teaching, and it is respectfully submitted that there is no suggestion of such invention in WO 92 01585 A.

Yamazaki, et al., in US 5,460,136 A, consider an evaporative emission control system with more than one chamber, which improves adsorption efficiency when the system is used to capture both on-board refueling and other evaporative losses. It is respectfully submitted that this teaching is irrelevant to the invention of the instant application because the patent teaching only concerns canister hardware, not the properties of the adsorbent contained therein.

Reddy, in US 6,279,548 B1, describes a canister having more than one chamber that achieves improved regeneration by heating a volume of adsorbent at the purge inlet. The disclosure of the instant application does not teach heating the adsorbent; therefore, such feature is not claimed by the applicants.

In view of the above descriptions of the cited references, it is apparent that their designation as by the international searching authority "not particularly relevant" is accurate.

The remaining three references cited in the International Search Report, however, were designated to be "of particular relevance." Therefore, it was deemed that compliance with the disclosure requirements of 37 C.F.R.§§ 1.56, 1.97, and 1.98 required the necessary effort to have the application withdrawn from issue, even though the issue fee had been paid, to request continued examination for their consideration by the examiner in resolving the issue of patentability.

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The additional cited references include EP 11 13163 to Tennex Corporation, WO 01 62367 to MacDowall et al., and U.S. Patent No. 6,488,748 to Yamafuji et al. (formerly an application published as US 2001-0020418).

The International Search Report also included a copy of the search results for the published application, EP 1,113,163, of Tennex. The document discloses an improvement in 'conventional" vapor treatment technology as disclosed by Japanese Patent Provisional Publication No. 9-112356. The document describes a canister that comprises a single compartment with layers of adsorbent and alternate layers of heat accumulative material. The EP application describes a canister containing an adsorbent mixed with a heat absorbing material that has a heat capacity higher than that of the adsorbent, and considers multiple chambers and layer configurations designed to overcome drawbacks of the earlier design. In each of these inventions, canister working capacity is proposed to increase over canisters filled with adsorbent alone because heat produced during uptake of vapor is absorbed to a greater extent, so that the temperature of the adsorbent does not increase as much as it would in the absence of the heat absorbing material. Likewise the temperature would not decrease as much during regeneration. Therefore, more vapors would be picked-up during adsorption and more removed during purge. The EP application contends that this strategy is so effective that engine operation may be disrupted by too much vapor being released during regeneration purge. The object of the EP application is to overcome this drawback by physical arrangement of the different layers of adsorbent and heat absorbing materials, and by particular constructions of the adsorption canister.

The parts of EP 1,113,163 cited as relevant to the instant application are:

Pg 18, Para 64, which describes a honeycomb form of adsorbent incorporating a dispersed mixture of adsorbent, binder, and heat accumulative material. The previous paragraph lists aluminum, aluminum alloy, and ceramic as examples of heat accumulative materials.

<u>Claims 1-6</u> specify different arrangements of canisters incorporating fuel adsorbing and heat accumulative materials, wherein the heat accumulative material has a heat capacity higher than that of the adsorbent.

Figs 1-7 show different canister configurations and different ways of partitioning fuel adsorbing and heat accumulative materials.

The Tennex application teaches that the working capacity of automotive fuel treatment canisters can be improved by incorporation of heat accumulating materials into the canister or directly into an adsorbent form such as a honeycomb. This is quite different from the object of the invention claimed in the instant application, which is directed more specifically toward control of diurnal bleed emissions from automotive canisters, and on a volume basis, use of the invention actually tends to decrease the working capacity of the canister system. The applicants' disclosure teaches that the canister system should consist of a volume of fuel adsorbing material

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with high adsorption capacity, and a separate volume of bleed control adsorbent. The bleed control adsorbent preferably has a high adsorption capacity on a mass basis, but is distributed in space so that its volumetric capacity is relatively low according to a claimed range. The distribution in space of the adsorbent can be attained by different means, one of which is dispersion by the addition of diluents and/or binders. However, such dispersing materials are not required to have a heat capacity even as high as the adsorbent itself. The applicants' experiments showed, for example, that when activated carbon was dispersed in a pellet by dilution with glass microbeads, the performance in control of bleed emissions was the same whether the beads were solid, with a relatively high heat capacity, or hollow, with a relatively low heat capacity. Coincidentally, honeycomb forms of activated carbon made by extrusion of a mixture of carbon and clays under our commonly-assigned patent contain components which could contribute to heat absorption, but good performance of honeycomb elements in bleed control is not related to this. A honeycomb element contains so little carbon (in relation to the clay-based material) that heat exchange with purge gas easily offsets the cooling due to desorption during purge, which would be appreciated by one skilled in the art. Furthermore, little heat is generated during the adsorption of bleed emissions because both the vapor concentration and flow rate influent to the honeycomb is very small.

It is respectfully submitted, therefore, that the teaching of published application EP 11 13163 would not suggest, to one skilled in the art, the claimed invention of the instant application.

Macdowall, et al., in WO 01 6267 A, describe a canister system that uses a layered bed consisting of a first layer of conventional activated carbon and a smaller second layer of another adsorbent with faster adsorption kinetics. Optionally, the two layers might be located in separate containers. In either case, the adsorbent with faster kinetics is located to receive first contact with purge air during regeneration. Pelletized activated carbon is eited as an example of conventional adsorbent. Examples of adsorbents with faster kinetics include materials with smaller particle size, or other favorable shape, and materials with a favorable but undefined pore size distribution. The only supporting data concerns use of smaller particle size for the second layer, and the most preferred embediment of this invention is stated to be characterized by the external particle surface-area-to-volume ratios of the smaller and larger particles in the two layers.

<u>Pg 4, Ln 9-29</u>, noted by the searcher, discusses use of two separate adsorbents, differentiated by adsorption kinetics.

The claimed invention of the instant application does not rely upon adsorption kinetics to obtain desired performance. Required dilution of cartion particles in a matrix of nonadsorbent material would actually be expected to cause slower adsorption kinetics for the some of our

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claimed embodiments. Thus, a teaching of reliance on adsorption kinetics would not suggest what the applicants did, as defined by the claims of the instant application.

Pg 5, Ln 15-20, also noted by the searcher, states

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The amount of adsorbents is selected such that the adsorption capacity in the lower heat capacity section is greater than the capacity in the higher heat capacity section. This generally means that the weight of adsorbent in the lower heat capacity section is greater than the weight of adsorbent in the higher heat capacity section.

This feature of the MacDowall et al. invention is based on the necessity of restricting the increase in pressure drop resulting from use of smaller particles, and on observed improvements in experimental breakthrough performance. It must be noted, however, that the demonstrated improvement was obtained using different particle sizes of the same carbon in the first and second layers. While this clearly supports the kinetic concept exposited by their invention, it is not relevant to the applicants' claimed invention, which teaches the use of different adsorbents with a particular range of equilibrium volumetric capacity in the second layer.

Finally, the searcher noted the "claims" to be somehow relevant. However, the claims of the reference principally concern adsorption rate and particle size of first and second adsorbents. None of which are relevant to our invention, as it places no reliance on kinetics or particle size.

Lastly, Yamafuji et al., in U.S. Patent No. 6,488,748/US 2001/020418 A1, describe a canister system with two or more compartments or layers containing a conventional adsorbent in the first layer, and material with higher heat capacity in the second layer. The higher heat capacity can be produced by selecting a particular adsorbent with a high heat capacity, or by mixing another material with high heat capacity with the adsorbent in this layer. Goals are the same as in the Tennex published application EP 1,113,163.

Attention was called by the searcher to:

<u>Pg 3. paragraphs 44 and 45</u>, which report that the heat capacity of the second layer can be increased by adding particles of materials with higher specific heat and thermal conductivity including alumina, glass, etc., iron, copper, lead, etc.

The applicants' claimed invention may use glass; or clays containing alumina, in a dispersive matrix with carbon to dilute the adsorptive activity of the carbon component, but beneficial properties are in no way based on heat management, and it is coincidental that such materials may also increase heat capacity. It is respectfully submitted that there is no teaching or

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suggestion that the adsorbents disclosed by Yamafuji et al. fall within the specifically defined ranges of adsorption capacity claimed by the applicants.

In his earlier statement of reasons for allowance that resulted in this application's postissue fee paid status, the Examiner noted that the applicants' claimed "method for reducing fuel vapor emissions in automotive evaporative emissions control systems comprising the steps of contacting the fuel vapor with an initial adsorbent volume having incremental adsorption capacity at 25°C of greater than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane and at least one subsequent adsorbent volume having an incremental adsorption capacity of less than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% nbutane is not taught, disclosed or suggested in a single reference or a combination of references in the prior art of record." It is respectfully submitted that, having placed the above disclosed and discussed prior art in the record of examination of the instant application, that statement by the examiner remains true. Moreover, the Examiner's further statement that "The closest prior art discloses evaporative emission prevention systems comprising different sorbents for reducing diurnal breathing but fails to suggest using sorbents having the butane working capacities specified above [in applicants' claim 1]." It is respectfully submitted that, having placed the above disclosed and discussed prior art in the record of examination of the instant application, that statement by the examiner also remains true.

Although noted of varying degrees of relevance in an international search report in a foreign application filing based on the instant U.S. application, these citations do not necessarily constitute an admission that the references are relevant or material to the claims; they are cited only as constituting the closest art of which the applicant has recently been made aware.

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Respectfully Submitted,

Terry B AcDunel Attorney for the Applicants Registration No. 28,444

Attachments

Dated: December 10, 2002 5255 Virginia Avenue Post Office Box 118005 Charleston, SC 29423-8005 (843) 746-8493

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	To:
•	WESTVACO CORPORATION NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT
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	UNITED STATES OF AMERICA NOV 2 2002 (PCT Rule 44.1)
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	Applicant
	WESTVACO CORPORATION
	1. X The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.
	Filing of amendments and statement under Article 19: The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Fluis 46):
	When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.
	Where? Directly to the International Bureau of WIPO 34, chemin des Colombettes
	1211 Geneva 20, Switzerland Fascimäe No.: (41–22) 740,14,35
	For more detailed instructions, see the notes on the accompanying sheat.
	2. The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.
	3. With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
	the protest together with the decision thereon has been transmitted to the international Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
	4. Surther entire (a). The englight is provided of the initiation
	Shortly after 16 months from the priority date, the international application will be published by the International Bureau.
· · · ·	or the applicant wisnes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the international Bureau as provided in Rules 90 <i>bis</i> .1 and 90 <i>bis</i> .3, respectively, before the completion of the technical preparations for international publication.
	Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 80 months from the priority date (in some Offices even tater).
	Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter 1).
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8437468494; Dec-10-02 4:41PM; Page 17 NOTES TO FORM PCT/ISA/220 These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty, in case of discrepancy between these Notes and these requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO. In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively. INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19 The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be mended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 succept where, or the applicant wants the latter to be published tor the purposes of provisional protection or has another reason for amending the claims before international publication, Furthermore, it should be emphasized that provisional protection is available in some States only. What parts of the International application may be amanded? Under Article 19, only the claims may be amended, During the international phase, the claims may also be amended (or further amended) under Article 34 before the international Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority. Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41. Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later, it should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Fule 46.1). Wh Where not to file the smaridments? The amendments may only be field with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 45.2). Where a demand for international pretiminary examination has been its filed, are below. How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed. A replacement sheet must be submitted for each street of the claims which, on account of an amendment or amendments, differs from the sheet originally field. All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Seption 205(b)). The amondments must be made in the isinguage in which the international application is to be published. What documents must/may accompany the amendments? Letter (Section 205(b)): The amendments must be submitted with a letter. The letter will not be published with the international application and the emended claims, it should not t confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)"). The letter must be in English or French, at the choice of the applicant. However, if the language of the International application is English, the letter must be in English; if the language of the international application is French. Notes to Form PGTASA/220 (first sheet) (January 1994)

1. 4. ¹ .			<u>,</u>
	E C	NOTES TO FORM PCT/ISA/220 (continued)	
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		The letter must indicate the differences between the blaims as filed and the claims as emended, it must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether	
		() the claim is unchanged;	
	1	(ii) the claim is cancelled;	
		(iii) the claim is new;	
	a de la companya de la	(iv) the claim replaces one or more claims as filed;	
•		$\{v\}$ the claim is the result of the division of a claim as field.	
		The following examples illustrate the manner in which amendments must be explained in the	
	ł	accompanying lotter:	
		 [Where originally there were 48 claims and after amendment of some claims there are 51]; "Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended plaims bearing the same numbers; 	
		claims 30, 33 and 36 unchanged; new claims 49 to 51 added."	
		2. (Where originally there were 15 claims and after amendment of all claims there are 11):	
	1	"Claims 1 to 15 replaced by arranged claims 1 to 11."	
		, prevention of the second of	
		"Claims 1 to 5 and 14 unchanged; claims 7 to 13 cancelsed; new claims 15, 16 and 17 access. Or "Claims 7 to 13 cancelled; new claims 15, 16 and 17 access all other claims unchanged."	
		4. [Where various kinds of amendments are made];	
		"Claims 1-10 unchanged; claims 11 to 13,15 and 19 cancelled; claims 14, 15 and 19 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."	
		"Statement under article 19(1)" (Fuie 46.4)	
		The amandments may be accompanied by a statement explaining the amandments and indicating any impact	
		that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).	
		The statement will be published with the international application and the amended claims.	
	1	It must be in the language in which the informational appplication is to be published.	
		It must be brief, not exceeding 500 words if in English or if translated into English.	
		It should not be contrased with and does not replace the tetter indicating the differences between the claims	
		preterably by using the words. Statement under Article 19(1)."	
		It may not contain any disparaging commercia on the international search report or the relevance of obtaine .	
		report may be made only in connection with an amendment of that claim.	
	Conservery	e if a demand for international amilminary examination has already been filed	
		If, at the time of filing any emendments under Article 19, a demand for international preliminary examination	
		has already been submitted, the applicant must preferably, at the same time of sling the emeridments with the trian stimps! Bureau, also file a core of such amandmenta with the International Preliminary Examining	
		Authority (see Fulle 62.2(a), first sentence).	
	. •		
	Consequence	a with regard to translation of the international application for entry into the national phase	
		The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the dama as amended under Article 19 may have to be furnished to the designated/sected Offices, instead of, or	
	2	in addition to, the translation of the claims as filed,	
		For further details on the requirements of each designated/elected Office, see Volume II of the POT Applicant's Guide	
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PATENT COOPERATION TREATY



INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

,	Applicant's or agent's file reference	FOR FURTHER see Notification C (Form PCT/ISA/2	of Transmittel of International Search Report 20) as well as, where applicable, item 5 below.						
*	International application No.	Internetional filing date (day/month/year)	(Earliest) Priority Date (day/month/year)						
	PCT/US 02/21621	08/07/2002	21/11/2001						
-4	Applicant								
	WESTVACO CORPORATION								
	This international Search Report has be according to Article 18. A copy is being	een prepared by this International Searching Aut transmitted to the International Bureau.	hority and is transmitted to the applicant						
	This International Search Report consist X It is also accompanied	sts of a total of <u>4</u> eheels. by a copy of each prior ant document citad in this	s report.						
	1. Basis of the report								
	 With regard to the language, b language in which it was filed, to 	ne International search was carried out on the ba unless otherwise indicated under lhis item.	sis of the International application in the						
	the international search Authority (Rule 23.1(b)	n was carried out on the basis of a translation of I).	the international app#cation furnished to this						
	 With regard to any nucleotide was carried out on the basis of 	and/or amino acid sequence disclosed in the in the sequence isting :	nternational application, the international search						
	Contained in the Internet	nternational application in wheen form.	m.						
		to this Authority in written form.							
	furnished subsequently to this Authority in computer readble form.								
	the statement that the international application	subsequently furnished written sequence listing on a filed has been furnished.	does not go beyond the disclosure in the						
	the statement that the furnished	information recorded in computer readable form	is identical to the written sequence listing has been						
	2. Certain claims were f	ound unsearcheble (See Box I).							
	3. Unity of invention is i	acking (see Box II).	Ϋ́Υ.						
	4. With regard to the title,	· · · · ·	•						
	X the text is approved as	submitted by the applicant.							
	the text has been estat	olished by this Authority to read as follows:							
	4		ł						
		:							
	E. With ennoted to the abertrant	ана стана стана Стана стана стан	•						
	a: Will regard to the approach	submitted by the analigant							
	the text has been estal within one month from	blished, according to Rule 38.2(b), by this Author the date of mailing of this international search re	ity as it appears in Box III. The applicant may, port, submit commants to this Authority.						
	6. The figure of the drawings to be p	ublished with the abstract is Figure No.	2						
i i	as suggested by the eq	oplicant.	None of the figures.						
	because the applicant X because this figure between the second secon	failed to suggest a figure. ter characterizes the invention.							
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	¢	INTERNATIONAL SEARCH	REPORI	International Applica PCT/US 02/2	1621
	A. CLASSIFI	CATION OF SUBJECT MATTER F02M25/08 B01D53/04			
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	According to	International Patent Classification (IPC) or to both national classi	fication and IPC	- 	
4	B. FIELDS S	EARCHED umentation searched (classification system followed by classific	ation symbols)		
	IPC 7	F02M B01D			τ
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	Documentaik	on searched other than minimum documentation to the extent the	at such documents are	incluced in the nexus sear	cneo
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	Electronic da	ta base consulted during the international search (name of data	base and, where pra	cical, search lerms used)	8
	EPO-Int	ernal .			e a
			· · ·		
	C. DOCUME	NTS CONSIDERED TO BE RELEVANT		<u>_</u>	Belevant to claim his
	Çalegory '	Citation of document, with increation, where appropriate, or the	toterani passague		12
- - -	X .	EP 1 113 163 A (TENNEX CORP) 4 July 2001 (2001-07-04)			1-8,11, 12, 14-16, 18-21,
. 4		column 18, paragraph 64; claims figures 7-12	1-6;		24-29
	x	WO 01 62367 A (MACDOWALL JAMES MICHIEL TRIJNISSE (NL); KLEUT D 30 August 2001 (2001-08-30) page 4, line 9-29 page 5, line 15-20; claims	DUFF ;KLEIJ JIRK VAN)		1-9,11, 18-22,24
			-/		
		•			
	X Furt	her documents are listed in the continuation of box C.	X Patent I	lamity members are listed in	1 Annex.
	 Special ca Special ca consid 'E⁴ docume which citation 'O' docume other 	(spones of cited documents : ant defining the general state of the last which is not rered to be of particular relevance document but published on or after the International alle in which may throw doubts on priority claim(s) or is clead to establish the publication date of another in or other special reason (as specified) on referring to an oral disclosure, use, exhibition or means	 'T' jater docume or priority di cited to and hwention 'X' document of cannot be c involve an it 'Y' document of connot be c document is ''Y' document is 	In published after the inten are and not in conflict with the ierstand the principle of the particular relevance; the ci- considered novel of cannot i particular relevance; the ci- considered to involve an invo scondined with ope or mor- n combination being obviour	Actional filing date the application but say underlying the seconsidered to unrani is taken alone atmed investion enthor step whan the mother such docsi- s to a person scaled
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page 1 of 2

• •		INTERNATIONAL SEARCH REPORT	Application No 02/21621
	C.(Continue Category *	Ition) DOCUMENTS CONSIDERED TO BE RELEVANT Chailon of document, with Indication, where appropriate, of the relevant passages	Relevant to staim No.
	X	US 2001/020418 A1 (ITAKURA YUJİ ET AL) 13 September 2001 (2001-09-13)	1,2,4,8, 11,15,
-		page 3, paragraphs 44,45	21,24,26
•	A	WO 92 01585 A (BRITISH PETROLEUM CO PLC) 6 February 1992 (1992-02-06) the whole document	
	A	US 5 460 136 A (YAMAZAKI KAZUMI ET AL) 24 October 1995 (1995-10-24) cited in the application the whole document	
	A	US 6 279 548 B1 (REDDY SAM RAGHUMA) 28 August 2001 (2001-08-28) the whole document	
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Page 98 of 141

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8437468494; Dec-10-02 4:43PM; ~ Page 22 INTERNATIONAL SEARCH REPORT International Application No Information on potent family m embere PCT/US 02/21621 Patent document cited in search report Publication date Patent family member(s) Publication date 2001248504 A 1113163 T1 1113163 A2 14-09-2001 17-01-2002 04-07-2001 EP 1113163 A 04-07-2001 JP DE EP US 2001015134 A1 23-08-2001 AU WO 3621301 A 0162367 A1 03-09-2001 30-08-2001 WO 0162367 А 30-08-2001 06-07-2001 US 2001020418 A1 13-09-2001 JP 2001182631 A AU WO 8281391 A 9201585 A1 18-02-1992 06-02-1992 WO 9201585 A 06-02-1992 2934699 B2 7174050 A US 5460136 A 24-10-1995 JP 16-08-1999 11-07-1995 JP US 6279548 NONE ₿1 28-08-2001

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PTO/SB/17 (10-01) Approved for use through 10/31/2002. OMB 0851-0032 Trademark Office; U.S. DEPARTMENT OF COMMERCE offormation unless II. disubays a valid OMB control number. U.S. Patent ar n Act of 1995, no n Complete if Known FEE TRANSMITTAL 10/100.362 Application Number ATC ALLE for FY 2002 03/18/2002 Filing Date L. H. HIIZIK First Named Inventor Frank M. Lawrence Jr Patent fees are subject to annual revision. Examiner Name Group Art Unit 1724 TOTAL AMOUNT OF PAYMENT 1050.00 (\$) Attomey Docket No. CHR 2001-79 METHOD OF PAYMENT FEE CALCULATION (continued) The Commissioner Is hereby authorized to charge indicated fees and credit any overpayments to: 1. 🗹 3. ADDITIONAL FEES Small Entity Deposit Account Number Large Entity 23-1160 Fee Fee Fee Code (\$) Code Fee (\$) Fee Description Fee Paid Deposit Account Name Westvaco Corporation 105 130 205 65 Surcharge - late filing fee or oath 127 50 227 25 Surcharge - late provisional filing fee or cover sheet Charge Any Additioned Fee Required Under 37 CFR 1.18 and 1.17 Non-English specifica Applicant claims small entity statue. See 37 CFR 1.27 139 130 139 130 147 2,520 147 2,520 For filing a request for ex parte reexamination Payment Enclosed: 2. 112 920* 112 920* Requesting publication of SIR prior to Examiner action Check Credit card Money Other 113 1.840* 113 1.840* Requesting publication of SIR after Examiner action FEE CALCULATION 115 110 215 55 Extension for reply within first month 1. BASIC FILING FEE Large Entity Small Entity Fee Fee Fee Fee Fee Code (\$) Code (\$) 116 400 216 200 Extension for reply within second month Fee Description 117 920 217 460 Extension for reply within third month Fee Paid 1 118 1,440 218 720 Extension for reply within fourth month 101 740 201 370 Utility filing fee 3ROUP 1701 128 1,960 228 980 106 330 206 165 Design filing fee Extension for reply within fifth month T 2001 L 107 510 207 255 Plant filling fee 119 320 219 160 Notice of Appeal 108 740 208 370 Reissue filing fee 120 320 220 160 Filing a brief in support of an appeal 114 160 214 80 Provisional filling fee 121 280 221 140 Request for oral hearing 138 1,510 138 1,510 Û Patition to institute a public use proceeding SUBTOTAL (1) (\$) 140 110 240 . 55 Patition to revive - unavoidable 2. EXTRA CLAIM FEES 141 1,280 241 640 Patition to revive - unintentional Fee from below Extra Claims 142 1.280 242 840 Utility issue fee (or reissue) Fee Pald Total Claims -20** # 143 460 243 230 x Design issue fee Independent Claims Multiple Dependent - 3** = х 144 620 244 310 Plant Issue fee 172 130 122 130 Petitions to the Commis 123 60 123 50 Processing fee under 37 CFR 1.17(g) Large Entity Small Entity Fee Fee Fee Fee Code (\$) Code (\$) 126 180 128 180 180.00 Submission of Information Disclosure Stmi Fee Description Recording each patient assignment per property (times number of properties) 581 40 581 40 103 18 203 Ð Claims in excess of 20 102 84 202 42 Filing a submission after final rejection (37 CFR § 1.129(a)) Independent claims in excess of 3 146 740 246 370 104 280 204 140 Multiple dependent claim, if not paid For each additional invention to examined (37 CFR § 1.129(b)) 149 740 249 370 ** Reisaue independent claima over original patent 109 84 209 42 740.00 110 18 210 9 740 279 370 Request for Continued Examination (RCE) ** Reissue claims in excess of 20 and over original patent 179 169 900 169 900 Request for expedited examination of a design application (\$) Other fee (specify) Petition to Commissioner SUBTOTAL (2) 130.00 SUBTOTAL (3) (\$) 1050.00 **or number previously paid, if greater; For Reissues, see above Reduced by Basic Filing Fee Paid SUBMITTED BY Complete (if annil Name (PrinkType) Terry B. McDaniel Altomer/Agenti Telephone (843) 740-2331 Shi Signature 1 an 1 Date 12/10/2002 WARNING:/Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief information Officer, U.S. Patent and Trademark Office, Washington, DC 20231, DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS, SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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RECHEST	Serial No.	10/100 282
FOR	Filing Date	March 18, 2001
CONTINUED EXAMINATION (RCI	-) First Named Inventor	
TRANSMITTAL	Group Art Unit	1724
35 USC 132(b) effective May 29, 2000	Examiner:	F.M. Lawrence .lt
	Attorney Docket No:	CHR 2001-79
This is a Request for Continued Examination (I identified application.	RCE) under 37 C.F.R.	§ 1.114 for the above
i. ☐ Consider the amendment(s)/repl ii. ☐ Consider the arguments in the A iii. ☐ Other: b. ⊠ Enclosed i. ☐ Amendment/Reply ii. ⊠ Affidavit(s)/ <u>Declaration(s) In su</u> iii. ⊠ Information Disclosure Statement iv. ⊠ Other: Petition to Withdraw from 2. <u>Miscellaneous</u> a. ☐ Suspension of action on the above-identif 1.103(c) for a period of months. (Period o 37 C.F.R. § 1.17(i) required.) b. ☐ Other:	y under 37 C.F.R. § 1.16 fil ppeal Brief/Reply Brief filed pport of Petition to Withd t (IDS) PTO-1449 and cop issue fied application is requested f suspension shall not exce	ed on on raw From Issue ies of references d under 37 C.F.R. § red 3 months; fee under
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 a. The Director is hereby authorized to charge Deposit Account No. 23-1160. i. RCE fee required under 37 C.F.R. § 1 ii. Extension of time fee (37 C.F.R. § 1.1: iii. Other: b. Check in the amount of \$ is enclored. c. Payment is made by credit card (Form F.d. Fee Transmittal Form authorizing to charge Signature: Signature: Terry B. McDaniel Signature: May May May May May May May May May May	the following fees, or cre 17(e). 36 and 1.17). 38 and 1.17). TO-2038 enclosed). TO-2038 enclosed. TO-2038 enclosed. TO-203	FAX RECEIVED
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 a. The Director is hereby authorized to charge Deposit Account No. 23-1160. b. RCE fee required under 37 C.F.R. § 1 c. Extension of time fee (37 C.F.R. § 1.11) c. Other: b. Check in the amount of \$ is enclosed. c. Payment is made by credit card (Form F.d. Fee Transmittal Form authorizing to char SiGNATURE OF APPLICANT, ATT Name: Terry B. McDaniel Signature: b. McDaniel c. May May May May May May May May May May	the following fees, or cre 17(e). 36 and 1.17). sed. TO-2038 enclosed). rge indicated fees (PTO/SE ORNEY OR AGENT REQU Registration Number: Date: <u>December 10, 2002</u>	FAX RECEIVED

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Group Art Unit:

Page 10

Case Docket No. CHR 2001-79 Serial No. 10/100,362

1724

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: L. H. Hiltzik, J. Z. Jagiello, E. D. Tolles, R. S. Williams

Serial No.: 10/100,362

Filed: 03/18/02

Sent By: CTC;

For: Method For Reducing Emissions From Evaporative Emission Control Systems

Examiner: Frank M. Lawrence Jr.

Honorable Commissioner of Patents and Trademarks Washington, DC 20231

FAX RECEIVED DEC 1 1 2002 PETITIONS OFFICE

INFORMATION DISCLOSURE STATEMENT

Dear Sir:

Under the provisions of 37 C.F.R.§§ 1.56, 1.97, and 1.98, applicant submits herewith copies of publication that the Office may wish to consider in continued examination of the subject application. The publications are listed on the attached form PTO-1449.

I hereby certify that each item of information contained in this information disclosure statement was first cited in a communication, dated November 19, 2002, from a foreign patent office in a counterpart foreign application and first came to the attention of the undersigned attorney on December 2, 2002, after being forwarded from the corporate receiving office for such correspondence in Atlanta, GA. The Commissioner is hereby authorized to charge the fee set forth in 37 C.F.R. §1.17 (p) in the amount of \$180.00, which is listed on the enclosed Fee Transmittal form.

Allowability of the claims of the instant application was based on the examiner's finding that "the closest prior art discloses evaporative emission control systems comprising different

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Case Docket No. CHR 2001-79 Scrial No. 10/100,362

sorbents for reducing diurnal breathing but fails to suggest using sorbents having the (specified) butane working capacities."

Of the six documents cited in the attached International Search Report, describing canisters with layers or compartments containing different adsorbents or containing heat absorbing or heat generating media, three are considered to define the general state of the art but are "not considered to be of particular relevance." These are WO 92 01585 A to British Petroleum Co., U.S. Patent No. 5,460,136 to Yamazaki et al., and U.S. Patent No. 6,279,548 to Reddy,

WO 92 01585 A describes the use of two different adsorbents to improve canister working capacity. The first adsorbent is conventional activated carbon, and the second is selected from a group of adsorbent organic polymers. A claimed feature is that purge gas first enters the activated carbon component. The disclosure of the instant application, on the other hand, teaches that for bleed emission control the purge gas must first enter the special adsorbent, not the conventional activated carbon component. The invention claimed is consistent with such teaching, and it is respectfully submitted that there is no suggestion of such invention in WO 92 01585 A.

Yamazaki, et al., in US 5,460,136 A, consider an evaporative emission control system with more than one chamber, which improves adsorption efficiency when the system is used to capture both on-board refueling and other evaporative losses. It is respectfully submitted that this teaching is irrelevant to the invention of the instant application because the patent teaching only concerns canister hardware, not the properties of the adsorbent contained therein.

Reddy, in US 6,279,548 B1, describes a canister having more than one chamber that achieves improved regeneration by heating a volume of adsorbent at the purge inlet. The disclosure of the instant application does not teach heating the adsorbent; therefore, such feature is not claimed by the applicants.

In view of the above descriptions of the cited references, it is apparent that their designation as by the international searching authority "not particularly relevant" is accurate.

The remaining three references cited in the International Search Report, however, were designated to be "of particular relevance." Therefore, it was deemed that compliance with the disclosure requirements of 37 C.F.R.§§ 1.56, 1.97, and 1.98 required the necessary effort to have the application withdrawn from issue, even though the issue fee had been paid, to request continued examination for their consideration by the examiner in resolving the issue of patentability.

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Case Docket No. CHR 2001-79 Serial No. 10/100,362

The additional cited references include EP 11 13163 to Tennex Corporation, WO 01 62367 to MacDowall et al., and U.S. Patent No. 6,488,748 to Yamafuji et al. (formerly an application published as US 2001-0020418).

The International Search Report also included a copy of the search results for the published application, EP 1,113,163, of Tennex. The document discloses an improvement in "conventional" vapor treatment technology as disclosed by Japanese Patent Provisional Publication No. 9-112356. The document describes a canister that comprises a single compartment with layers of adsorbent and alternate layers of heat accumulative material. The EP application describes a canister containing an adsorbent mixed with a heat absorbing material that has a heat capacity higher than that of the adsorbent; and considers multiple chambers and layer configurations designed to overcome drawbacks of the earlier design. In each of these inventions, canister working capacity is proposed to increase over canisters filled with adsorbent alone because heat produced during uptake of vapor is absorbed to a greater extent, so that the temperature of the adsorbent does not increase as much as it would in the absence of the heat absorbing material. Likewise the temperature would not decrease as much during regeneration. Therefore, more vapors would be picked-up during adsorption and more removed during purge. The EP application contends that this strategy is so effective that engine operation may be disrupted by too much vapor being released during regeneration purge. The object of the EP application is to overcome this drawback by physical arrangement of the different layers of adsorbent and heat absorbing materials, and by particular constructions of the adsorption canister.

The parts of EP 1,113,163 cited as relevant to the instant application are:

Pg 18, Para 64, which describes a honeycomb form of adsorbent incorporating a dispersed mixture of adsorbent, binder, and heat accumulative material. The previous paragraph lists aluminum, aluminum alloy, and ceramic as examples of heat accumulative materials.

<u>Claims 1-6</u> specify different arrangements of canisters incorporating fuel adsorbing and heat accumulative materials, wherein the heat accumulative material has a heat capacity higher than that of the adsorbent.

Figs 1-7 show different canister configurations and different ways of partitioning fuel adsorbing and heat accumulative materials.

The Tennex application teaches that the working capacity of automotive fuel treatment canisters can be improved by incorporation of heat accumulating materials into the canister or directly into an adsorbent form such as a honeycomb. This is quite different from the object of the invention claimed in the instant application, which is directed more specifically toward control of diurnal bleed emissions from automotive canisters, and on a volume basis, use of the invention actually tends to decrease the working capacity of the canister system. The applicants' disclosure teaches that the canister system should consist of a volume of fuel adsorbing material

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Case Docket No. CHR 2001-79 Serial No. 10/100,362

with high adsorption capacity, and a separate volume of bleed control adsorbent. The bleed control adsorbent preferably has a high adsorption capacity on a mass basis, but is distributed in space so that its volumetric capacity is relatively low according to a claimed range. The distribution in space of the adsorbent can be attained by different means, one of which is dispersion by the addition of diluents and/or binders. However, such dispersing materials are not required to have a heat capacity even as high as the adsorbent itself. The applicants' experiments showed, for example, that when activated carbon was dispersed in a pellet by dilution with glass microbeads, the performance in control of bleed emissions was the same whether the beads were solid, with a relatively high heat capacity, or hollow, with a relatively low heat capacity. Coincidentally, honeycomb forms of activated carbon made by extrusion of a mixture of carbon and clays under our commonly-assigned patent contain components which could contribute to heat absorption, but good performance of honeycomb elements in bleed control is not related to this. A honeycomb element contains so little carbon (in relation to the clay-based material) that heat exchange with purge gas easily offsets the cooling due to desorption during purge, which would be appreciated by one skilled in the art. Furthermore, little heat is generated during the adsorption of bleed emissions because both the vapor concentration and flow rate influent to the honeycomb is very small.

It is respectfully submitted, therefore, that the teaching of published application EP 11 13163 would not suggest, to one skilled in the art, the claimed invention of the instant application.

Macdowall, et al., in WO 01 6267 A, describe a canister system that uses a layered bed consisting of a first layer of conventional activated carbon and a smaller second layer of another adsorbent with faster adsorption kinetics. Optionally, the two layers might be located in separate containers. In either case, the adsorbent with faster kinetics is located to receive first contact with purge air during regeneration. Pelletized activated carbon is cited as an example of conventional adsorbent. Examples of adsorbents with faster kinetics include materials with smaller particle size, or other favorable shape, and materials with a favorable but undefined pore size distribution. The only supporting data concerns use of smaller particle size for the second layer, and the most preferred embodiment of this invention is stated to be characterized by the external particle surface-area-to-volume ratios of the smaller and larger particles in the two layers.

<u>Pg 4. Ln 9-29</u>, noted by the searcher, discusses use of two separate adsorbents, differentiated by adsorption kinetics.

The claimed invention of the instant application does not rely upon adsorption kinetics to obtain desired performance. Required dilution of carbon particles in a matrix of nonadsorbent material would actually be expected to cause slower adsorption kinetics for the some of our

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Page 14

Case Docket No. CHR 2001-79 Serial No. 10/100,362

claimed embodiments. Thus, a teaching of reliance on adsorption kinetics would <u>not</u> suggest what the applicants did, as defined by the claims of the instant application.

Pg 5. Ln 15-20, also noted by the searcher, states

Sent By: CTC;

The amount of adsorbents is selected such that the adsorption capacity in the lower heat capacity section is greater than the capacity in the higher heat capacity section. This generally means that the weight of adsorbent in the lower heat capacity section is greater than the weight of adsorbent in the higher heat capacity section.

This feature of the MacDowall et al. invention is based on the necessity of restricting the increase in pressure drop resulting from use of smaller particles, and on observed improvements in experimental breakthrough performance. It must be noted, however, that the demonstrated improvement was obtained using different particle sizes of the same carbon in the first and second layers. While this clearly supports the kinetic concept exposited by their invention, it is not relevant to the applicants' claimed invention, which teaches the use of different adsorbents with a particular range of equilibrium volumetric capacity in the second layer.

Finally, the searcher noted the "claims" to be somehow relevant. However, the claims of the reference principally concern adsorption rate and particle size of first and second adsorbents. None of which are relevant to our invention, as it places no reliance on kinetics or particle size.

Lastly, Yamafuji et al., in U.S. Patent No. 6,488,748/US 2001/020418 A1, describe a canister system with two or more compartments or layers containing a conventional adsorbent in the first layer, and material with higher heat capacity in the second layer. The higher heat capacity can be produced by selecting a particular adsorbent with a high heat capacity, or by mixing another material with high heat capacity with the adsorbent in this layer. Goals are the same as in the Tennex published application EP 1,113,163.

Attention was called by the searcher to:

<u>Pg 3. paragraphs 44 and 45</u>, which report that the heat capacity of the second layer can be increased by adding particles of materials with higher specific heat and thermal conductivity including alumina, glass, etc., iron, copper, lead, etc.

The applicants' claimed invention may use glass, or clays containing alumina, in a dispersive matrix with carbon to dilute the adsorptive activity of the carbon component, but beneficial properties are in no way based on heat management, and it is coincidental that such materials may also increase heat capacity. It is respectfully submitted that there is no teaching or

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Case Docket No. CHR 2001-79 Serial No. 10/100,362

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Sent By: CTC;

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Case Docket No. CHR 2001-79 Serial No. 10/100,362

suggestion that the adsorbents disclosed by Yamafuji et al. fall within the specifically defined ranges of adsorption capacity claimed by the applicants.

In his earlier statement of reasons for allowance that resulted in this application's postissue fee paid status, the Examiner noted that the applicants' claimed "method for reducing fuel vapor emissions in automotive evaporative emissions control systems comprising the steps of contacting the fuel vapor with an initial adsorbent volume having incremental adsorption capacity at 25°C of greater than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% n-butane and at least one subsequent adsorbent volume having an incremental adsorption capacity of less than 35 g n-butane/L between vapor concentrations of 5 vol% and 50 vol% nbutane is not taught, disclosed or suggested in a single reference or a combination of references in the prior art of record." It is respectfully submitted that, having placed the above disclosed and discussed prior art in the record of examination of the instant application, that statement by the examiner remains true. Moreover, the Examiner's further statement that "The closest prior art discloses evaporative emission prevention systems comprising different sorbents for reducing diurnal breathing but fails to suggest using sorbents having the butane working capacities specified above [in applicants' claim 1]." It is respectfully submitted that, having placed the above disclosed and discussed prior art in the record of examination of the instant application, that statement by the examiner also remains true.

Although noted of varying degrees of relevance in an international search report in a foreign application filing based on the instant U.S. application, these citations do not necessarily constitute an admission that the references are relevant or material to the claims; they are cited only as constituting the closest art of which the applicant has recently been made aware.

6

Respectfully Submitted,

Attorney for the Applicants Registration No. 28,444

Attachments

Sent By; CTC;

Dated: December 10, 2002 5255 Virginia Avenue Post Office Box 118005 Charleston, SC 29423-8005 (843) 746-8493
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Sheet SERIAL NO.. ຸດໂ Form PTO-1449 (REV. 8-83) Atty Dricket Ne US. DEPT.OF COMMERCE CHR 2001-79 10/100,362 PATENT AND TRADEMARK OFFICE APPLICANT INFORMATION DISCLOSURE CITATION L.H. Hiltzik, J.Z. Jagiello, E.D. Tolles, and R.S. Williams (Use several sheets if necessary) FILING DATE GROUP 03/18/02 1725 U.S. PATENT DOCUMENTS DOCUMENT NUMBER DATE NAME CLASS FILING DATE SUHCI.ASS 5 4 6 ٥ 1 3 6 10/95 Yamazaki et al. б 7 2 9 5 4 8 08/01 Reddy Yamafuji et al. (Publication No. 8 7 6 4 8 8 4 12/02 US 2001-0020418 (09/01) FOREIGN PATENT DOCUMENTS TRANSLATION DOCUMENT NUMBER DAILR COUNTRY CLASS SUBCLASS 1755 EP 11 I 3 1 6 3 7/01 European Palent Office Publication _ WO 01 6 2 3 6 7 8/01 PCT Publication WO 92 0 1 5 8 5 9/92 PCT Publication

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

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*EXAMINER: Initial if piration consist with next communication with applicant. with MPRP 509; Draw the through clation if not in conformance and not considered. Include copy of this form

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Page 5

Case Docket No. CHR 2001-79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: L. H. Hiltzik, J. Z. Jagiello, E. D. Tolles, R. S. Williams

Filed:March 18, 2002Group Art Unit: 1724Serial No.:10/100,362For:"Method For Reducing Emissions From Evaporative Emission

Control Systems"

Examiner: Frank M. Lawrence

Assistant Commissioner for Patents U. S. Patent and Trademark Office Washington, D. C. 20231

PETITION FOR WITHDRAWAL FROM ISSUE UNDER 37 C.F.R. §1.313(c)(2)

Dear Sir:

Applicants hereby petition to have the above-described patent application withdrawn from issue under 37 C.F.R. §1.313(c)(2).

1. Accompanying material

Accompanying this petition is a declaration by

__applicant

X applicants' attorney

showing good and sufficient reasons why withdrawal of the application from issue is necessary.

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Page 110 of 141

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Page 6

Case Docket No. CHR 2001-79 Serial No. 10/100,362

2. Fee

In accordance with 37 C.F.R. §1.313, the fee set forth in 37 C.F.R. §1.17(h) is hereby submitted with this petition, as permission to authorize a charge to Deposit Account 23-1160.

2

Respectfully submitted,

Terry E. McDaniel Attorney for the Applicants Registration No. 28,444

Attachments December 10, 2002 5525 Virginia Avenue P. O. Box 118005 Charleston, South Carolina 29423-8005 Phone (843) 740-2311 FAX (843) 740-2335

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Page 7

Case Docket No. CHR 2001-79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: L. H. Hiltzik, J. Z. Jagiello, E. D. Tolles, R. S. Williams

Serial No.

Filed:

For:

"Method For Reducing Emissions From Evaporative Emission Control Systems"

Examiner:

Assistant Commissioner for Patents U. S. Patent and Trademark Office Washington, D. C. 20231

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DECLARATION IN SUPPORT OF PETITION TO WITHDRAW FROM ISSUE UNDER 37 C.F.R. § 1.313(c)(2) PETITIONS OFFICE

Dear Sir:

I, Terry B. McDaniel, Esq., declare as follows:

10/100.362

March 18, 2002

Frank M. Lawrence

(1) I am an attorney-of-record for the applicants in the above-identified application and, having drafted the specification and claims thereof, I am fully aware of the subject matter of the invention thereof and of the field of invention in which it resides. Upon my receipt of the results of the prior art search conducted by the European Patent Office (EPO) in conjunction with the PTC filing based on the instant application, I was made aware for the first time of prior art references that appear to be material and relevant to the examination of the instant application, but have not been examined (which is a basis for this petition to have this application withdrawn from issue under 37 C.F.R. $\S1.313(c)(2)$).

(2) The instant application describes a method for sharply reducing diurnal breathing loss emissions from automotive evaporative emissions canisters by the use of multiple layers, or stages, of adsorbents. On October 8, 2002, the Examiner mailed the notice of allowance of claims 1-30 responsive to the filing of the instant application. The issue fee was timely paid on November 11, 2002. To date, the application has not issued as a U.S. Patent.

In view of the facts set forth, the undersigned attorney-of-record in this application petitions for withdrawal of the application from issue for consideration of a request for continued examination in compliance with 37 C.F.R. §1.114(c). An Information Disclosure Statement

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Case Docket No. CHR 2001-79

Page B

listing the newly discovered references, with some discussion to distinguish from the invention disclosed and claimed in the instant application, is also enclosed for consideration.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC § 1001 and that such false statements may jeopardize the validity of this document and the application to which it relates.

Signed at Charleston, South Carolina, this 10th day of December, 2002.

Attorney for the Applicants Registration No. 28,444

Enclosure

5255 Virginia Avenue P. O. Box 118005 Charleston, SC 29423-8005 Tel (843) 740-2311 Fax (843) 740-2335

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925 P. C Cha	5 Virginia Avenue 5. Box 118005 uleston, SC 29423-8005		
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FRO	DM: NDER'S PHONE #:	Terry B. McDaniel (843) 746-8493	FAX RECEIVED
SEr	DER 5 FAX #:	(843) /46-8494	DEC 1 1 2002
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Attac	thed please find a <u>duplicate</u> fr	ax, which was sent on 12/10/02 containing the following:	
1	Confirmation of Receipt of Certificate of Transmissic Fee Transmittal Form PT Petition to Withdraw from	on under 37 CFR 1.8 dated 12/10/02 O/SB/17	
	Confirmation of Receipt of Certificate of Transmissio Fee Transmittal Form PT Petition to Withdraw from Declaration in Support of Request for Continued Ex Information Disclosure St PTO - 1449	on under 37 CFR 1.8 dated 12/10/02 O/SB/17 In Issue Under 37 CFR 1.3 J3(c)(2) Petition Atomination (RCE) Transmittal Form Atomination (RCE) Transmittal Form	
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Page 3

Case Docket No. CHR 2001-79 Serial No. 10/100,362

Certificate of Transmission under 37 CFR 1.8

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office

On <u>December 10, 2002</u>. Date

Sent By: CTC;

Terry B. McDaniel Attorney for the Applicants Registration No. 28,444 Typed or printed name of person signing Certificate

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Note: Each paper must have its own certificate of transmission, or this certificate must identify each submitted paper.

Fcc Transmittal Form PTO/SB/17 Petition to Withdraw from Issue Under 37 CFR 1.313 (c)(2) Declaration in Support of Petition Request for Continued Examination (RCE) Transmittal form Information Disclosure Statement PTO-1449 Copies of Cited Art

Total 140 pages

Sent By: CTC; 8437468494; 2 5:24 PAGE 1/1 OMPANY: Dec-11-02 9:12AM; Pade 2 USPTO 12/10/ 1 KIGNTFAX O:Auto-reply fax to 8437468494 Auto-Reply Facsimile Transmission TO: Fax Sender at 8437468494 UNITED STATES PATENT AND Fax Information 12/10/02 4:36:38 PM [Eastern Standard Time] TRADEMARK OFFICE Date Received: **Total Pages:** 133 (including cover page) ADVISORY: This is an automatically generated return receipt confirmation of the facsimile transmission received by the Office. Please check to make sure that the number of pages listed as received in Total Pages above matches what was intended to be sent. Applicants are advised to retain this receipt in the unlikely event that proof of this facsimile transmission is necessary. Applicants are also advised to use the certificate of facsimile transmission procedures set forth in 37 CFR 1.8(a) and (b), 37 CFR 1.6(f). Trademark Applicants, also see the Trademark Manual of Examining Procedure (TMEP) section 306 et seq. dent By: 010; 8437468494; Dec-10-02 4:5 Page 1 Received Cover Page Cate Docket Pd, CHK 2001-79 Ratia No. 10/100.162 ===> **FAX RECEIVED** Cortificate of Transmission under 37 CFR 1.8 **DEC** 1 1 2002 ly that this socrespond and Tesdamark Office **PETITIONS OFFICE** a 10. 2002 n PTO/SB/I er 37 CFR 1.313 (a)(2) on Inne Ur son arlon (EC2) PTD-1449 Capics of Clied Art Total 140 pages reiters · とどを完全レス ロービン · ストア 「「「 Factors Manders

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Patent fees are subject to annual revi	ion. Exam	ner Name	FIALIK IVI. LAWIE	nce Jr.	
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be included on this form. Provide credit card information and authorization on PTO-2038.
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the amount of time you are required to complete this form should be sent to the Chiof Information Officer, U.S. Patent and Trademark Office, Washington, DC
20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



UNITED STATES PATENT AND TRADEMARK OFFICE

WESTVACO CORPORATION 5255 VIRGINIA AVENUE P O BOX 118005 CHARLESTON, SC 29423-8005 Commissioner for Pater United States Patent and Trademark Off Washington, D.C. 202 www.uspto. Paper No.

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DEC 1 1 2002

OFFICE OF PETITIONS

In re Application of Laurence H. Hiltzik et al Application No. 10/100,362 Filed: March 18, 2002 Attorney Docket No. CHR 2001-79

ON PETITION

This is a decision on the petition, filed by facsimile transmission on December 11, 2002, under 37 CFR 1.313(c)(2) to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid on November 19, 2002 in the above-identified application cannot be refunded. If, however, the above-identified application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.¹

Telephone inquiries should be directed to the undersigned at (703) 305-8680.

Upon receipt of the file in the Office of Petitions, the file will be forwarded to Technology Center AU 1724 for processing of the request for continued examination under 37 CFR 1.114 and for consideration of the concurrently filed Information Disclosure Statement.

Frances Hicks

Petitions Examiner Office of Petitions Office of the Deputy Commissioner for Patent Examination Policy

¹ The request to apply the issue fee to the new Notice must be made in writing and should be accompanied by the new Issue Fee Transmittal Form PTOL-85(b), along with a copy of this decision. Additionally, if the issue fee has increased from the previously paid issue fee, the balance due must be submitted. Failure to <u>timely</u> request <u>in</u> <u>writing</u> that the previously paid issue fee be applied towards the new Notice and payment of any balance due will result in the abandonment of the application.

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APPLICATION NO.	FILING DATE	FIRST NAME	D INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/100,362	03/18/2002	Laurence	H. Hiltzik	CHR 2001-79	3899
TITLE OF INVENTION M	ETHOD FOR REDUCING	EMISSIONS FROM EVAPOR	ATIVE EMISSIONS CO	ONTROL SVETENC	λ
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PETITION BY THE	APPLICANT. SEE 3	7 CFR 1.313 AND MPE	P 1308.		
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MAILING DATE OF	THIS NOTICE OR	THIS APPLICATION S	SHALL BE REGA	RDED AS ABANDONED.	THIS STATUTORY
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10/100,362	03/18/2002	I	Laurence H. Hiltzi	k	CHR 2001-79	3899
TITLE OF INVENTION: M	IETHOD FOR REDUCING	EMISSIONS FROM E	EVAPORATIVE E	MISSIONS CON	TROL SYSTEMS	
APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLI	CATION FEE	TOTAL FEE(S) DUE	DATE DUE
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Commissioner for Patents is	requested to apply the Issue	e Fee and Publication Fe	ee (if any) or to re-	apply any previou	sly paid issue fee to the application	on identified above.
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/100,362	03/18/2002	Laurence H. Hiltzik		CHR 2001-79	3899
75	90 01/27/2003			EXAMIN	ER
Westvaco Corpora	ation		:	LAWRENCE JR	, FRANK M
5255 Virginia Aven P.O. Box 118005	nue	and the second sec		ART UNIT	PAPER NUMBER
Charleston, SC 294	23-8005	_	,	1724	
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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The patent term adjustment to date is 0 days. If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the term adjustment will be 0 days.

If a continued prosecution application (CPA) was filed in the above-identified application, the filing date that determines patent term adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system. (http://pair.uspto.gov)

Any questions regarding the patent term extension or adjustment determination should be directed to the Office of Patent Legal Administration at (703)305-1383.

Page 3 of 4

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

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P.O. Box 118005	inde ,		ART UNIT	PAPER NUMBER
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Notice of Fee Increase on January 1, 2003

If a reply to a "Notice of Allowance and Fee(s) Due" is filed in the Office on or after January 1, 2003, then the amount due will be higher than that set forth in the "Notice of Allowance and Fee(s) Due" since there will be an increase in fees effective on January 1, 2003. <u>See Revision of Patent and Trademark Fees for Fiscal Year 2003</u>; Final Rule, 67 Fed. Reg. 70847, 70849 (November 27, 2002).

The current fee schedule is accessible from: http://www.uspto.gov/main/howtofees.htm.

If the issue fee paid is the amount shown on the "Notice of Allowance and Fee(s) Due," but not the correct amount in view of the fee increase, a "Notice to Pay Balance of Issue Fee" will be mailed to applicant. In order to avoid processing delays associated with mailing of a "Notice to Pay Balance of Issue Fee," if the response to the Notice of Allowance and Fee(s) due form is to be filed on or after January 1, 2003 (or mailed with a certificate of mailing on or after January 1, 2003), the issue fee paid should be the fee that is required at the time the fee is paid. If the issue fee was previously paid, and the response to the "Notice of Allowance and Fee(s) Due" includes a request to apply a previously-paid issue fee to the issue fee now due, then the difference between the issue fee amount at the time the response is filed and the previously paid issue fee should be paid. See Manual of Patent Examining Procedure, Section 1308.01 (Eighth Edition, August 2001).

Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Page 4 of 4

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

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	Application No.	Applicant(s	$\frac{1}{1}$
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	Frank M. Lawrence	1724	
The MAILING DATE of this communication apper All claims being allowable, PROSECUTION ON THE MERITS IS herewith (or previously mailed), a Notice of Allowance (PTOL-85) NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RI of the Office or upon petition by the applicant. See 37 CFR 1.313	ears on the cover speet (OR REMAINS) CLOSED or other appropriate com GHTS. This application i and MPEP 1308.	with the correspondence) in this application, If no munication will be mailed s subject to withdrawal fr	ce address Tincluded In due course. THIS om issue at the initiative
 2. The allowed claim(s) is/are <u>1-30</u>. 3. The drawings filed on <u>18 March 2002</u> are accepted by the I 4. Acknowledgment is made of a claim for foreign priority und a) All b) Some* c) None of the: 	<u>d December 11, 2002</u> . Examiner. er 35 U.S.C. § 119(a)-(d)	or (f).	
2. Contined copies of the priority documents have	been received.		e
 2. Certified copies of the priority documents have 3. Copies of the certified copies of the priority doc International Bureau (PCT Rule 17.2(a)). * Certified copies not received: 5. Acknowledgment is made of a claim for domestic priority un (a) The translation of the foreign language provisional ap 6. Acknowledgment is made of a claim for domestic priority un 	been received in Applica suments have been receiv der 35 U.S.C. § 119(e) (t oplication has been receiv	tion No red in this national stage o a provisional application red.	application from the
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 8. CORRECTED DRAWINGS must be submitted. (a) including changes required by the Notice of Draftsperson (a) hereto or 2) to Paper No (b) including changes required by the proposed drawing or (c) including changes required by the attached Examiner's 	on's Patent Drawing Revi prrection filed, wh Amendment / Comment	ew (PTO-948) attached ich has been approved b or in the Office action of l	y the Examiner. ⊃aper No.
Identifying indicia such as the application number (see 37 CFR 1.8 of each sheet. The drawings should be filed as a separate paper w	4(c)) should be written on ith a transmittal letter add	the drawings in the top ma ressed to the Official Draft	argin (not the back) sperson.
9. DEPOSIT OF and/or INFORMATION about the deposit attached Examiner's comment regarding REQUIREMENT FOR TH	t of BIOLOGICAL MAT E DEPOSIT OF BIOLOG	ERIAL must be submi	tted. Note the
Attachment(s)			
 Notice of References Cited (PTO-892) Notice of Draftperson's Patent Drawing Review (PTO-948) Information Disclosure Statements (PTO-1449), Paper No. <u>8</u>. Examiner's Comment Regarding Requirement for Deposit of Biological Material 	2☐ Notice 4] Intervie 6] Examin 8⊠ Examin 9] Other	of Informal Patent Applica w Summary (PTO-413), I er's Amendment/Comme er's Statement of Reasor	ation (PTO-152) Paper No nt is for Allowance
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Page 123 of 141

Application/Control Number: 10/100,362 Art Unit: 1724

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-30 are allowed.

2. The following is an examiner's statement of reasons for allowance: Reasons for allowance are given in the office action of paper no. 7. The newly submitted information disclosure statement has been considered and the instant claims remain allowable over the cited references because none of the references suggests using sorbents having the butane working capacities recited in the independent claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The reference to Tolles et al. (5,238,470) discloses sorbents for emission control having high butane working capacities.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 703-305-0585. The examiner can normally be reached on Mon-Thurs 7:30-5:00; alternate Fridays 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Simmons can be reached on 703-308-1972. The fax phone numbers for the

Page 2

Application/Control Number: 10/100,362

Page 3

organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

fl H January 14, 2003

David A. Simmons Supervisory Patent Examiner Technology Center 1700

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TITLE OF INVENTION: ME	THOD FOR REDUCING FM	ISSIONS FROM EVAPORATIVE I	MISSIONS CONTROL SYSTEMS	3899
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Page 129 of 141





Case Docket No. CHR 2001-79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Laurence H. Hiltzik, Jacek Z. Jagiello, Edward D. Tolles, and Roger S. Williams

Patent No.: 6,540,815 B1

Serial No.: 10/100,362 Group Art Unit: 1724

Issued: April 1, 2003

For:

METHOD FOR REDUCING EMISSIONS FROM EVAPORATIVE EMISSIONS CONTROL SYSTEMS

Honorable Commissioner of Patents and Trademarks Washington, DC 20231

Certificate MAY 1 2 2003 of Correction

REQUEST FOR CERTIFICATE OF CORRECTION **UNDER RULE 322**

Dear Sir:

In accordance with the provisions of Rule 322 of the Rules of Practice, which implement 35 U.S.C. 254, the Patent and Trademark Office is requested to issue a Certificate of Correction in the above-identified patent, to show the corrections set forth on the attached Patent and Trademark Office Form PTO-1050.

Since these mistakes were the fault of the Patent and Trademark Office, it is believed to be in order for the Patent and Trademark Office to issue a Certificate of Correction on the enclosed patent document and to place such a Certificate of Correction in the file, so that such will appear on any copies of the patent which are ordered in the future. Moreover, since these mistakes are those of the Patent and Trademark Office, such should be done without charge to the patentee or assignee.

Case Docket No. CHR 2001-79

It is respectfully requested that when the above-requested Certificate of Correction has been completed and entered on the formal patent document, as well as in the file, that a duly authenticated Certificate of Correction be returned to the Attorney of Record.

Respectfully submitted,

Terry B. McDaniel Attorney for the Applicant Registration No. 28,444

TBM/sch Enclosure Dated: <u>May 1, 2003</u> 5255 Virginia Avenue P. O. Box 118005 Charleston, SC 29423-8005 (843) 746-8493



Case Docket No. <u>CHR 2001-79</u> Patent No. <u>6,540,815 B1</u>

CERTIFICATE UNDER 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being deposited with the United States

Postal Service as first class mail in an envelope addressed to the Commissioner for Patents,

Alexandria, VA 22313-1450, on <u>May 2, 2003</u>

Susan C. Harrison

BS Certificate MAY 1 2 2003 Of Correction

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NOTICE RE: CERTIFICATES OF CORRECTION Paper No. DATE : Supervisor, Art Unit 1724 то SUBJECT : Certificate of Correction Request in Patent No.: 6540815 A response to the following question is requested with respect to the accompanying request for a certificate of correction. With respect to the change(s) requested, correcting Office and/or Applicant's errors, should the pater read as shown in the certificate of correction? No new matter should be introduced, nor should the scope or meaning of the claims be changed. Was the reference entered of is this with the reference want to be entered its not stated in the references. ne PLEASE COMPLETE THIS FORM AND RETURN WITH FILE, WITHIN 7 DAYS, TO CERTIFICATES OF CORRECTION BRANCH - PK 3-915/922 PALM LOCATION 7580 - TEL. NO. 305-8309 THANK YOU FOR YOUR ASSISTANCE! Note your decision, regarding the changes requested in the Request for Certificate of Correction, by placing a check mark (\checkmark) in the box that reflects your decision, which corresponds to the question checked above. NO NO **X** Comments below YES references were not considered by the **Comments:** # they 20.00 wouldn were Art Unit SUPERVISORY SUPERVISORY **EXAMINER** CENTER 1700 TECHNOLOGY U.S. DEPARTMENT OF COMMERCE Patent and Trademark Of PTOL-306 (REV. 10/87)



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS UNITED STATES PATENT AND TRADEMARK OFFICE P.O. BOX 1450 ALEXANDRIA, VA 22313-1450 WWW.USplo.gov

Date Mailed :

Patent No.: 6540815Inventor(s): Hiltzik et al.Patent Issued: 4/1/03Title: METHOD FOR REDUCING EMISSIONS FROM EVAPORATIVEEMISSIONSCONTROL SYSTEMDocket No.:

Re: Request for Certificate of Correction

Consideration has been given your request for the issuance of a certificate of correction for the above-identified patent under the provisions of Rule(s)

Inspection of the patent application file reveals, that the alleged error(s) in the references were not considered by the examiner. The attorney was notified by phone that they were not considered and wouldn't be entered on the C of C. Therefore, no fault on the part of the Patent and Trademark Office, has no authority to issue a certificate of correction under the provisions of 35 U.S.C. 254 and rules of Practice of the United States Patent and Trademark Office in Patent Cases.

A certificate of correction will issue to correct the remaining errors noted in your request.

In view of the foregoing, your request in these/this matter, is hereby denied. However, further consideration will be given upon receipt of a Request for Reconsideration, which should be directed to Decisions and Certificate of Correction Branch. Requests for Reconsideration should be accompanied by additional support (e.g. copy of amendments, post card receipts. PTOL 1449 or 892, etc.), containing requested data or changes) and / or brief statements of facts, as requested.

Henry D Randall Decision and Certificate of Corrections (703) 306 – 2817 Cecelia Newman , Supervisor Decision and Certificates of Correction (703) 305 – 8309

Meadwestvaco Corporation 5255 Virginia Avenue P.O. Box 118005 Charleston, SC 29423-8005

CBN/hr

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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,540,815 B1 DATED : April 1, 2003 INVENTOR(S) : Laurence H. Hiltzik et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,

Item [56], **References Cited**, U.S. PATENT DOCUMENTS, insert: -- 5,957,114 9/1999 Johnson et al. 6,078,601 8/2000 Reddy --.

<u>Drawings</u>, Sheet 1, beneath Figure 1 delete "Prior Art."

Column 8, Table, Footnote 1, delete "Test" and insert therefor -- Tests ---.

Signed and Sealed this

Twenty-sixth Day of August, 2003

JAMES E. ROGAN

Director of the United States Patent and Trademark Office

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