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(54) **TEMPORARY VEHICLE FUEL VAPOUR ACCUMULATOR**

KURZZEITSPEICHER FÜR FAHRZEUGKRAFTSTOFFDÄMPFE

ACCUMULATEUR TEMPORAIRE DE VAPEURS D'ESSENCE DESTINE A UN VEHICULE

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(73) Proprietor: **Dayco Fuel Management S.p.A.
10123 Torino (IT)**

(72) Inventor: **DI BIASI, Pietro
I-10043 Orbassano (IT)**

(74) Representative: **Jorio, Paolo et al
STUDIO TORTA S.r.l.
Via Viotti, 9
10121 Torino (IT)**

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DescriptionTECHNICAL FIELD

[0001] The present invention relates to a temporary vehicle fuel vapour accumulator.

BACKGROUND ART

[0002] Automotive pollution regulations require that vehicles be equipped with a temporary accumulator or so-called "canister" for storing fuel vapours produced inside the tank when parking. Known canisters substantially comprise a chamber filled with adsorbent material, such as activated carbon in granules.

[0003] To ensure constant efficiency of the canister, the characteristics, in particular the grain size, of the activated carbon inside must remain unchanged; for which purpose, the granules must be compacted with no possibility of relative movement.

[0004] This is normally done by providing the storage chamber with a movable first wall or wall portion, which is loaded by springs or by means of spongy material to exert constant pressure on the activated carbon granules; and a second wall defined by a metal grille fitted with retaining and filtering means, or so-called retaining felts, made of polyester and which should provide for effectively filtering air flow in and out of the canister, while at the same time preventing any load loss.

[0005] In actual practice, however, it is difficult to select materials capable of maintaining high filtration power with no load loss.

[0006] EP-A-1 113 163 and US-A-5 559 384 disclose fuel vapour accumulators according to the preamble of claim 1, in which the adsorbent material is retained between partitions formed by a perforated plate and a filtering, sheet-like material interposed between the plate and the adsorbing material.

[0007] Each partition is therefore constituted by two distinct components and is thus relatively costly and bulky. It is an object of the present invention to provide a temporary fuel vapour accumulator with improved retaining and filtering means that solve the problems of known retaining and filtering means as discussed above.

DISCLOSURE OF INVENTION

[0008] According to the present invention, there is therefore provided a temporary vapour accumulator, as claimed in Claim 1.

[0009] In a preferred embodiment of the present invention, the first layer and second layer are made of polymer material.

BRIEF DESCRIPTION OF THE DRAWING

[0010] A non-limiting embodiment of the present invention will be described by way of example with refer-

ence to the accompanying drawing, which shows a schematic axial section of a vapour accumulator in accordance with the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0011] Number 1 in the accompanying drawing indicates a temporary fuel vapour accumulator or canister comprising a substantially cylindrical casing 2, in turn comprising a top end wall 3; a lateral wall 4; a bottom cover 5; and a vertical inner partition wall 6 extending axially from end wall 3 along a diametrical plane of casing 2 down to a distance D from cover 5, and cooperating hermetically with lateral wall 4 of casing 2.

[0012] Two blanks of a retaining and filtering web material 7 are fixed parallel to and a short distance from top wall 3 against spacer pins 31 on opposite sides of partition wall 16, so as to form, with top wall 3 and partition wall 6, a first and second compartment 8 and 9 interfacing canister 1 with the outside, as explained in detail later on. Preferably, web material 7 is welded, e.g. hot-blade welded, to peripheral shoulders 18 projecting inwards from top end wall 3. Web material 7 defines, upwards, a main chamber 10 of canister 1, which is divided by partition wall 6 into two top compartments 11, 12, and has a continuous bottom portion 13 by which compartments 11, 12 communicate.

[0013] Chamber 10 houses granular adsorbent material 14, such as activated carbon.

[0014] According to a feature of the present invention, retaining and filtering web material 7 is a multilayer web material including a first layer 7a, preferably of polymer material, in particular polycarbonate, for ensuring the necessary rigidity of retaining and filtering web material 7; and a second layer 7b of polymer material, preferably a nonwoven fabric of polyester or polyamide, in particular aromatic polyamide (or so-called aramide), for ensuring the necessary filtration capacity. The total weight of web material 7 preferably ranges between 150 and 200 gr/sq.m, and is preferably 190 gr/sq.m, and the total thickness preferably ranges between 0.6 and 1.5 mm, is preferably about 0.9 mm, and is therefore advantageously thinner than the known filtering material described previously, which on average is about 2.5 to 3.5 mm thick.

[0015] In bottom portion 13 of chamber 10, a layer 15 of elastically deformable spongy polymer material 16, in particular polyurethane foam, is placed in contact with bottom cover 5; which material 16 is precompressed to compact adsorbent material 14 between retaining and filtering web material 7 and layer 15, and exert sufficient compression to ensure maximum compaction of adsorbent material 14 and prevent any relative movement of the granules.

[0016] The height of layer 15, in the precompressed in-use condition, is less than distance D between the bottom end of partition wall 6 and bottom cover 5, so that part of bottom portion 13 of chamber 10 is filled with a continuous layer of material 14, and defines, with top

compartments 11 and 12 of chamber 10, a substantially U-shaped air and fuel vapour path connecting compartments 8 and 9 through material 14.

[0017] Canister 1 comprises a first fitting 20 extending through end wall 3 and retaining and filtering web material 7, and which comes out directly inside compartment 11 of chamber 10, is connected to the vehicle tank (not shown) by a pipe (not shown), and defines the fuel vapour inlet of canister 1. In end wall 3 are also formed a second fitting 21 connecting compartment 8 to the atmosphere; and a third wash fitting 22 communicating with compartment 9, and which is connected to the intake manifold of the engine (not shown) via a control valve (not shown).

[0018] Operation of canister 1 when parking and washing is known and therefore not described in detail.

[0019] Canister 1 is assembled by placing the blanks of retaining web material 7 on spacer pins 31, welding web material 7 to shoulders 18, filling chamber 10 with adsorbent material 14, placing layer 15 of spongy material and closing chamber 10 with cover 5.

[0020] Retaining web material 7 preferably provides for a 100% filtration power of less than 25 μm , and in particular of 15 μm , as compared with 40 μm to 80 μm of known web materials of the same section and made of polyester or polyamide, in particular aromatic polyamide (or so-called aramide), felt as described above.

[0021] At the same time, the load loss, measured at 20 cm/s, of web material 7 according to the present invention is 0.18 mbar, i.e. much less than that of known web material, which ranges roughly between 0.30 and 0.35 mbar.

[0022] The advantages of the vapour accumulator according to the present invention will be clear from the foregoing description.

[0023] In particular, the retaining and filtering web material employed provide for high air filtration capacity with no load loss, while at the same time providing the necessary rigidity to keep the granules of adsorbent material 14 compact, thus eliminating the drawbacks typically associated with known vapour accumulators.

[0024] Moreover, by virtue of the materials used, the retaining and filtering web material are thinner and have a longer working life.

[0025] Clearly, changes may be made to the vapour accumulator as described herein without, however, departing from the scope of the present invention.

[0026] In particular, different materials may be used for each of the two layers defining retaining web material 7.

Claims

1. A temporary vehicle fuel vapour accumulator comprising a casing (2) defining a chamber (10) containing an adsorbent material (14) in granules; elastic means (15) for exerting compression on said adsorbent material (14); and filtering and retaining means

(7) for retaining said granules inside said chamber; **characterized in that** said filtering and retaining means comprise a multilayer web material (7) comprising a first layer (7a) for ensuring rigidity, and a second layer (7b) for ensuring filtration power.

2. An accumulator as claimed in Claim 1, **characterized in that** the total thickness of said web material (7) is less than 1.5 mm.

3. An accumulator as claimed in Claim 2, **characterized in that** said first layer (7a) and said second layer (7b) are made of polymer material.

4. An accumulator as claimed in Claim 3, **characterized in that** said first layer (7a) is made of polycarbonate.

5. An accumulator as claimed in Claim 3 or 4, **characterized in that** said second layer (7b) is made of nonwoven fabric.

6. An accumulator as claimed in Claim 5, **characterized in that** said nonwoven fabric is made of polyester.

7. An accumulator as claimed in Claim 5, **characterized in that** said nonwoven fabric is made of polyamide.

8. An accumulator as claimed in any one of the foregoing Claims, **characterized by** having a 100% filtration power of less than 20 μm .

9. An accumulator as claimed in any one of the foregoing Claims, **characterized by** having a load loss at 20 cm/s of less than 0.25 mbar.

10. An accumulator as claimed in any one of the foregoing Claims, **characterized by** comprising elastic means (15) exerting compression on said adsorbent material (14) and defined by a layer of spongy polymer material (16).

11. An accumulator as claimed in any one of the foregoing Claims, **characterized in that** said adsorbent material (14) is activated carbon.

Patentansprüche

1. Kurzzeitspeicher für Fahrzeugkraftstoffdämpfe, umfassend ein Gehäuse (2), das eine Kammer (10) definiert, die ein Adsorbensmaterial (14) in Granalien; elastisches Mittel (15) zum Ausüben einer Kompression auf das Adsorbensmaterial (14); und Filter- und Haltemittel (7) zum Halten der Granalien innerhalb der Kammer enthält; **dadurch gekennzeichnet,**

- daß** das Filter- und Haltemittel ein Mehrschichtgewebematerial (7) umfaßt, das eine erste Schicht (7a) zum Gewährleisten von Steifigkeit und eine zweite Schicht (7b) zum Gewährleisten von Filtrationsleistung umfaßt.
2. Speicher nach Anspruch 1; **dadurch gekennzeichnet, daß** die Gesamtdicke des Gewebematerials (7) kleiner als 1,5 mm ist.
3. Speicher nach Anspruch 2, **dadurch gekennzeichnet, daß** die erste Schicht (7a) und die zweite Schicht (7b) aus Polymermaterial hergestellt sind.
4. Speicher nach Anspruch 3, **dadurch gekennzeichnet, daß** die erste Schicht (7a) aus Polycarbonat hergestellt ist.
5. Speicher nach Anspruch 3 oder 4, **dadurch gekennzeichnet, daß** die zweite Schicht (7b) aus Vliesstoff hergestellt ist.
6. Speicher nach Anspruch 5, **dadurch gekennzeichnet, daß** der Vliesstoff aus Polyester hergestellt ist.
7. Speicher nach Anspruch 5, **dadurch gekennzeichnet, daß** der Vliesstoff aus Polyamid hergestellt ist.
8. Speicher nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** eine 100%ige Filtrationsleistung bei weniger als 20 µm.
9. Speicher nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** einen Lastverlust bei 20 cm/s von weniger als 0,25 mbar.
10. Speicher nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** er elastisches Mittel (15) umfaßt, das eine Kompression auf das Adsorbensmaterial (14) ausübt, und welches durch eine Schicht eines schwammartigen Polymermaterials (16) definiert ist.
11. Speicher nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** das Adsorbensmaterial (14) Aktivkohle ist.
- retendue est constitué par un ou comprend un matériau formé d'un voile multicouche (7) comprenant une première couche (7a) destinée à assurer la rigidité, et une deuxième couche (7b) destinée à assurer la filtration.
2. Accumulateur selon la revendication 1, **caractérisé en ce que** l'épaisseur totale du dit matériau formé d'un voile (7) est inférieure à 1,5 mm.
3. Accumulateur selon la revendication 2, **caractérisé en ce que** ladite première couche (7a) et ladite deuxième couche (7b) sont en matériau polymère.
4. Accumulateur selon la revendication 3, **caractérisé en ce que** ladite première couche (7a) est en polycarbonate.
5. Accumulateur selon les revendications 3 ou 4, **caractérisé en ce que** ladite deuxième couche (7b) est en textile non tissé.
6. Accumulateur selon la revendication 5, **caractérisé en ce que** ledit textile non tissé est en polyester.
7. Accumulateur selon la revendication 5, **caractérisé en ce que** ledit textile non tissé est en polyamide.
8. Accumulateur selon l'une des revendications précédentes, **caractérisé en ce qu'il** possède un pouvoir filtrant à 100 % à moins de 20 µm.
9. Accumulateur selon l'une des revendications précédentes, **caractérisé en ce qu'il** procure une perte de charge à 20 cm/s inférieure à 0,25 mbar.
10. Accumulateur selon l'une des revendications précédentes, **caractérisé en ce qu'il** comporte un moyen élastique (15) comprimant ledit matériau adsorbant (14) et défini par une couche de matériau polymère spongieux (16).
11. Accumulateur selon l'une des revendications précédentes, **caractérisé en ce que** ledit matériau adsorbant (14) est du charbon actif.

Revendications

1. Accumulateur temporaire de vapeurs d'essence pour véhicule comprenant un boîtier (2) définissant une chambre (10) contenant un matériau adsorbant (14) en granules ; un moyen élastique (15) destiné à comprimer ledit matériau adsorbant (14) ; et un moyen de filtrage et de retenue (7) destiné à retenir lesdits granules à l'intérieur de ladite chambre ; **caractérisé en ce que** ledit moyen de filtrage et de

