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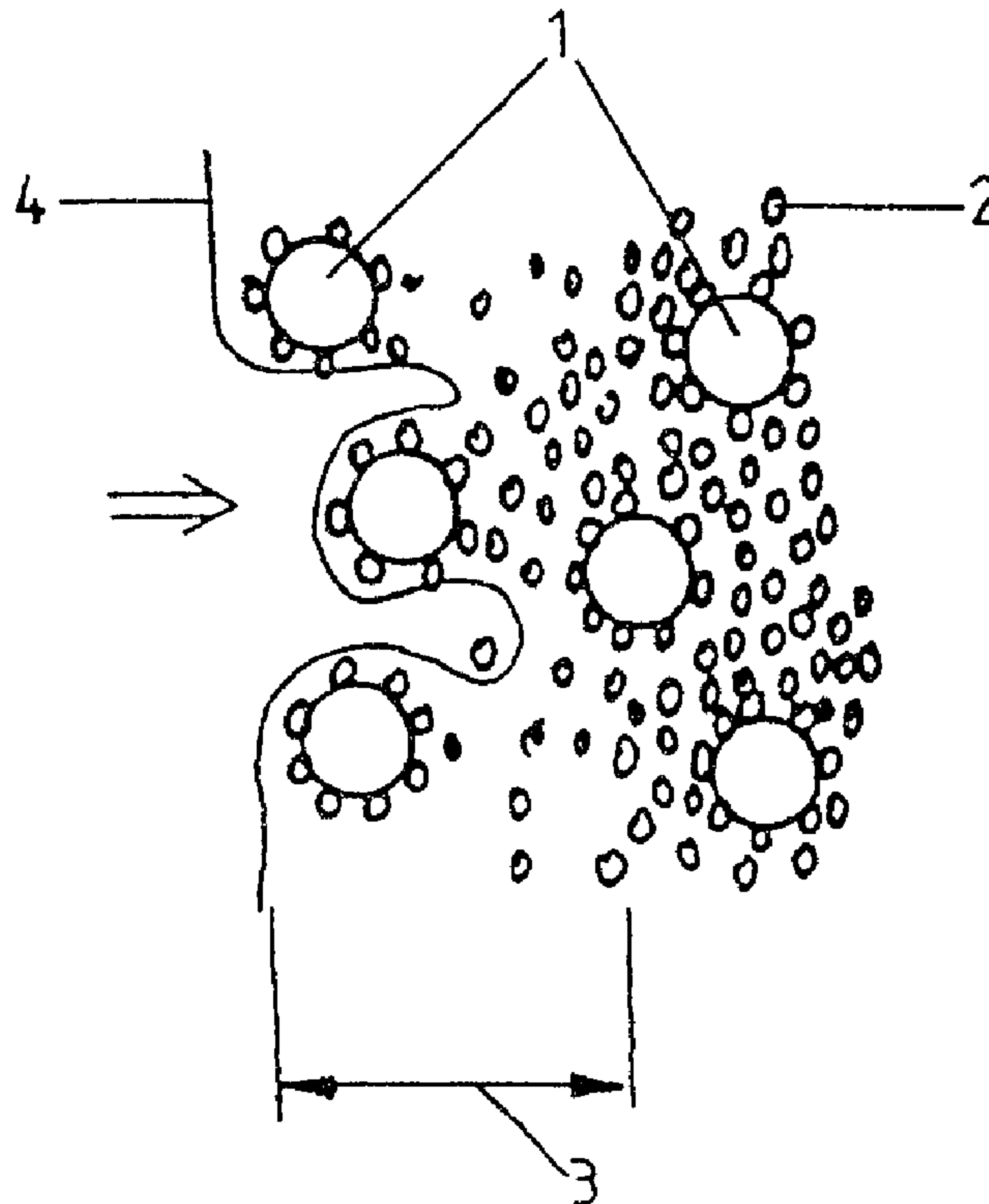
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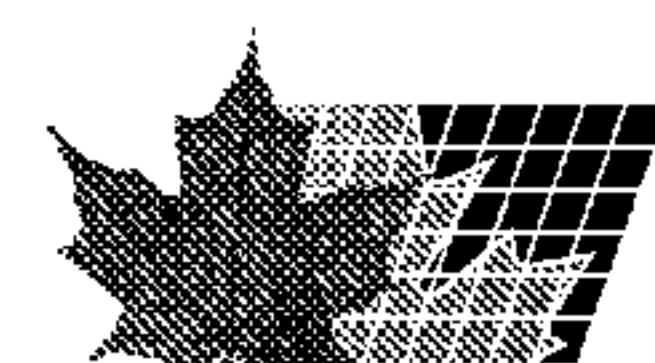
(54) Titre : ECRAN DE FILTRAGE OU DE CATALYSE

(54) Title: FILTER OR CATALYST BODY



(57) Abrégé/Abstract:

In the case of a filter or catalyst body comprising wires or fibres which are constructed in a single-layer or multi-layer as woven cloth, braiding or knitted fabric, the wires or fibres (1) are at least partially connected to one another by sintering or welding. The woven cloth, braiding or knitted fabric is endowed with inserted powdery, granular or chip-like particles (2), which are sintered with the wires or fibres (1), with the filter density being lower in the inlet region (3) of the filter body as fewer particles are provided there.



A b s t r a c t

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A filter or catalyst body

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fibres which are constructed in a single-layer or multi-
layer as woven cloth, braiding or knitted fabric, the wires
or fibres (1) are at least partially connected to one
another by sintering or welding. The woven cloth, braiding
or knitted fabric is endowed with inserted powdery, granular
or chip-like particles (2), which are sintered with the
15 wires or fibres (1), with the filter density being lower in
the inlet region (3) of the filter body as fewer particles
are provided there.

20

Fig. 2

A filter or catalyst body

5 The invention relates to a filter or catalyst body comprising wires or fibres, which are constructed in one or several layers as a woven cloth, braiding or knitted fabric, with the wires or fibres being at least partially connected to one another by sintering or welding.

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Filter and catalyst bodies respectively consisting of several layers or plies of woven cloths, braiding or knitted fabrics made from metal fibres or metal wires, which have been sintered together, are already known.

15

Filters of this type are used as so-called drop base filters, with the separation of the medium to be filtered occurring on the surfaces of the multilayer woven cloth, braiding or knitted fabric or its constituents. The efficiency of the
20 filter is limited by the available surface.

25

Such filters may also be used as catalysts, e.g. for cleaning exhaust gases from internal combustion engines in motor vehicles. Here too the largest possible surfaces are required to allow an exchange of electrons to occur.

Catalytically effective materials, such as platinum, rhodium or vanadium, for example, are accordingly used as catalysts.

30

Soot filters for diesel engines, which are usually made of ceramic material, are also known. The hot engine exhaust gases are conveyed through the ceramic filter body, and in the porous channels together with the prevailing higher temperatures the soot, i.e. carbon, is converted in the
35 filter walls of the filter body into gas and ash. Apart from ceramic filter bodies, filter bodies made of other filter

materials, such as sintered materials made from metal, have also already been proposed.

5 However the known filters and catalysts have the disadvantage that their separation surfaces are limited. For this reason a relatively large number of layers of woven cloths or knitted fabrics are required, with it being possible for the thicknesses to be between a few millimetres and several metres according to each case.

10

In German Patent Publication No. DE-39 08 581-A1 published on September 20, 1990, a process for the manufacture of a catalyst body and a catalyst in which powdery or granular particles are sintered onto the
15 individual layers or their components has already been proposed.

In this way a multiple surface enlargement is achieved, with which a much higher absorption surface and
20 consequently a considerably larger filter surface becomes available. Thus a clear reduction in size of the filter is obtained with the same filter capacity or a clearly higher filter capacity is achieved with the same size of filter.

25

The object of the invention is to improve even further a filter or catalyst body of this type with respect to its efficiency, in particular its filter capacity.

30 Therefore, in accordance with the present invention, there is provided a filter or catalyst body comprising wires or fibres, which are constructed in one or several layers as woven cloth, braiding or knitted fabric, with the wires or fibres being at least partially connected to
35 one another by sintering or welding, characterised in that the woven cloth, braiding or knitted fabric is endowed with inserted powdery, granular or chip-like

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particles, which are sintered with the wires or fibres, with the filter density being less in the inlet region of the filter body as fewer particles are provided there.

- 5 A type of preliminary filter is expediently created by varying the filter density, in particular the reduced filter density in the inlet region. In the course of the filter

operation this becomes clogged on the surface on the inlet side. A filter cake is expediently produced on the filter surface, which inter alia produces a higher counter pressure. This means that when used as an exhaust gas filter
5 for an internal combustion engine the engine power becomes correspondingly lower.

By the formation of the preliminary filter specified by the invention, a clearly greater dispersion of impurities to be
10 separated is surprisingly created in the filter. The unavoidable filter cake surface becomes larger, as it can penetrate deeper into the filter body because the filter density is less. In this way there is a clearly higher filter surface on the inlet side and thus also a higher
15 storage capacity. Consequently the filter does not become completely clogged up so quickly and there is also a smaller counter pressure.

In addition a further advantage is that the filter specified
20 by the invention is cheaper to manufacture with the same capacity, as less material is required.

In a possible development it may also be specified that the filter density in the outlet region decreases again because
25 fewer particles are provided.

With this development the counter pressure produced by the filter is reduced without any notable impairment of the efficiency of the filter. In this way it is possible for the
30 cleaned exhaust gases to flow away more easily.

The wires and fibres respectively can be made from metal, plastic, ceramics or mixtures thereof. If necessary other materials are also possible.

Particles of metal, plastic, ceramics or mixtures thereof, for example, may be used as particles which are placed in the woven cloth, braiding or knitted fabric.

- 5 If the filter is provided as a catalyst, catalytically effective materials, such as, for example, platinum, rhodium or vanadium, may be used to remove or convert carbon monoxide, hydrocarbons and nitrogen oxides.
- 10 When the filter is used as a soot filter, manganese, molybdenum or the like, which improve the soot conversion, may be used.

A material which can be sintered, such as, for example,
15 sintered metal may advantageously be used as the basic material for the woven cloth, braiding or knitted fabric. If particles which can be sintered are also used, then the metal fibres, metal wires and the particles can advantageously be sintered to one another in a single
20 sintering operation. In contrast with conventional filters, there results a large-scale sintering process, i.e. with greater contact surfaces, as a result of which the filter body also has greater strength.

- 25 An exemplified embodiment of the invention is described in principle below by means of the drawings.

Fig. 1 shows a filter of known design;

- 30 Fig. 2 shows the filter specified by the invention with a preliminary filter.

The known filter shown in Fig. 1 is made of metal wires 1, which are respectively connected to one another either
35 regularly or irregularly as braiding, knitted fabric or woven cloth or in layers for example.

Between the wires, which are made from sintered metal, for example, are inserted smaller particles 2, in the form of powder, rains or in chip form.

- 5 The insertion of the particles in the woven cloth, braiding or knitted fabric may be performed in various ways. Thus they can be inserted by an adhesive liquid, for example. They can also be inserted by shaking in, by an electric and/or magnetic charging and the like.

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When using materials which can be sintered, the filter body may subsequently be manufactured in a single operating cycle.

- 15 The process described in aforementioned German Patent Publication No. DE-39 08 581-A1 is modified according to the exemplified embodiment shown in Fig. 2 in that the provision or insertion of the particles 2 in the woven cloth, braiding or knitted fabric of wires 1 occurs so
20 that fewer particles are provided in an inlet region 3 of the filter body. For this purpose reference is made to the region shown in Fig. 2 by arrows. In this way a type of preliminary filter is created in the inlet region, with the filter density being small as a function of the
25 medium to cleaned so that the unavoidable filter cake formed from the impurities to be separated still partly penetrates into the filter body itself, i.e. into the inlet region 3. The course of the surface of the filter cake is represented by line 4 in Fig. 2. As can be seen,
30 the surface obtained as a result is substantially larger than the filter surface in the known filter body shown in Fig. 1, which is represented by line 5.

- The filter density may be less in the outlet region (not
35 shown) as in the inlet region 3 because of a correspondingly smaller allocation of particles 2.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A filter or catalyst body comprising wires or
5 fibres, which are constructed in one or several layers as woven cloth, braiding or knitted fabric, with the wires or fibres being at least partially connected to one another by sintering or welding, characterised in that the woven cloth, braiding or knitted fabric is endowed
10 with inserted powdery, granular or chip-like particles, which are sintered with the wires or fibres, with the filter density being less in the inlet region of the filter body as fewer particles are provided there.
- 15 2. A filter or catalyst body according to Claim 1, wherein the filter density increases from the inlet region in the direction of filtration by an increase in the number of particles.
- 20 3. A filter or catalyst body according to Claim 1 or 2, wherein the filter density decreases in the outlet region with a decrease in the number of particles.
4. A filter or catalyst body according to Claim 1 or 2,
25 wherein the woven cloth, braiding or knitted fabric is made of metal.
5. A filter or catalyst body according to Claim 1, 2 or 3,
30 wherein the woven cloth, braiding or knitted fabric is made of ceramics.
6. A filter or catalyst body according to Claim 1, 2 or 3,
35 wherein the woven cloth, braiding or knitted fabric is made of plastic.

7. A filter or catalyst body according to one or more of claims 1 to 3, wherein the woven cloth, braiding or knitted fabric is made of a mixture of metal and ceramic.
- 5 8. A filter or catalyst body according to one or more of claims 1 to 3, wherein the woven cloth, braiding or knitted fabric is made of a mixture of metal and plastic.
9. A filter or catalyst body according to one or more
10 of claims 1 to 3, wherein the woven cloth, braiding or knitted fabric is made of a mixture of ceramic and plastic.
10. A filter or catalyst body according to one or more
15 of claims 1 to 3, wherein the woven cloth, braiding or knitted fabric is made of a mixture of metal, ceramic and plastic.
11. A filter or catalyst body according to one or more
20 of Claims 1 to 10,
wherein the particles are made of a metal.
12. A filter or catalyst body according to one or more of claims 1 to 10,
25 wherein the particles are made of plastic.
13. A filter or catalyst body according to one or more of Claims 1 to 10,
wherein the particles are made of ceramics.
- 30 14. A filter or catalyst body according to one or more of claims 1 to 10, wherein the particles are made of a mixture of metal and ceramic.

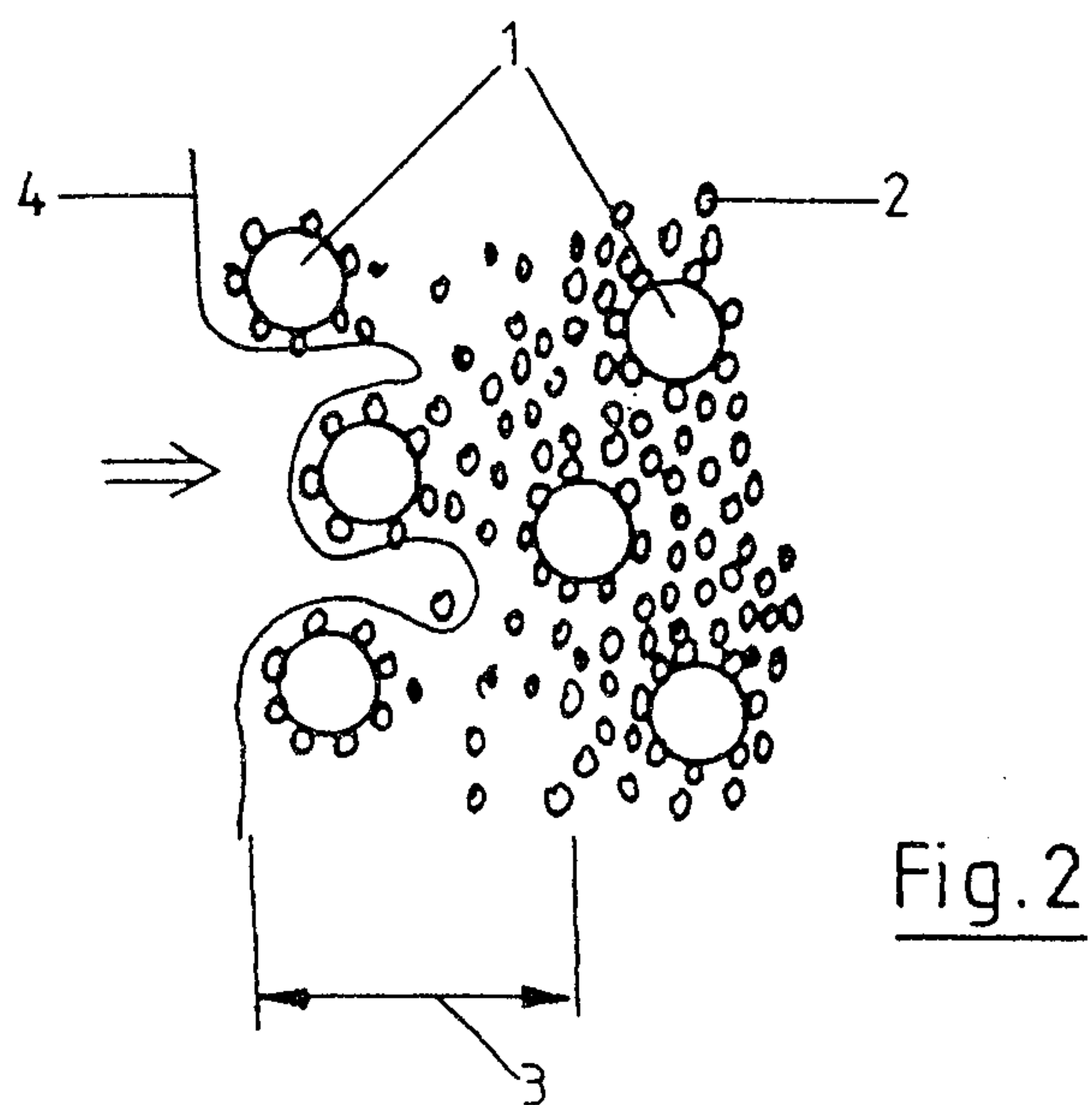
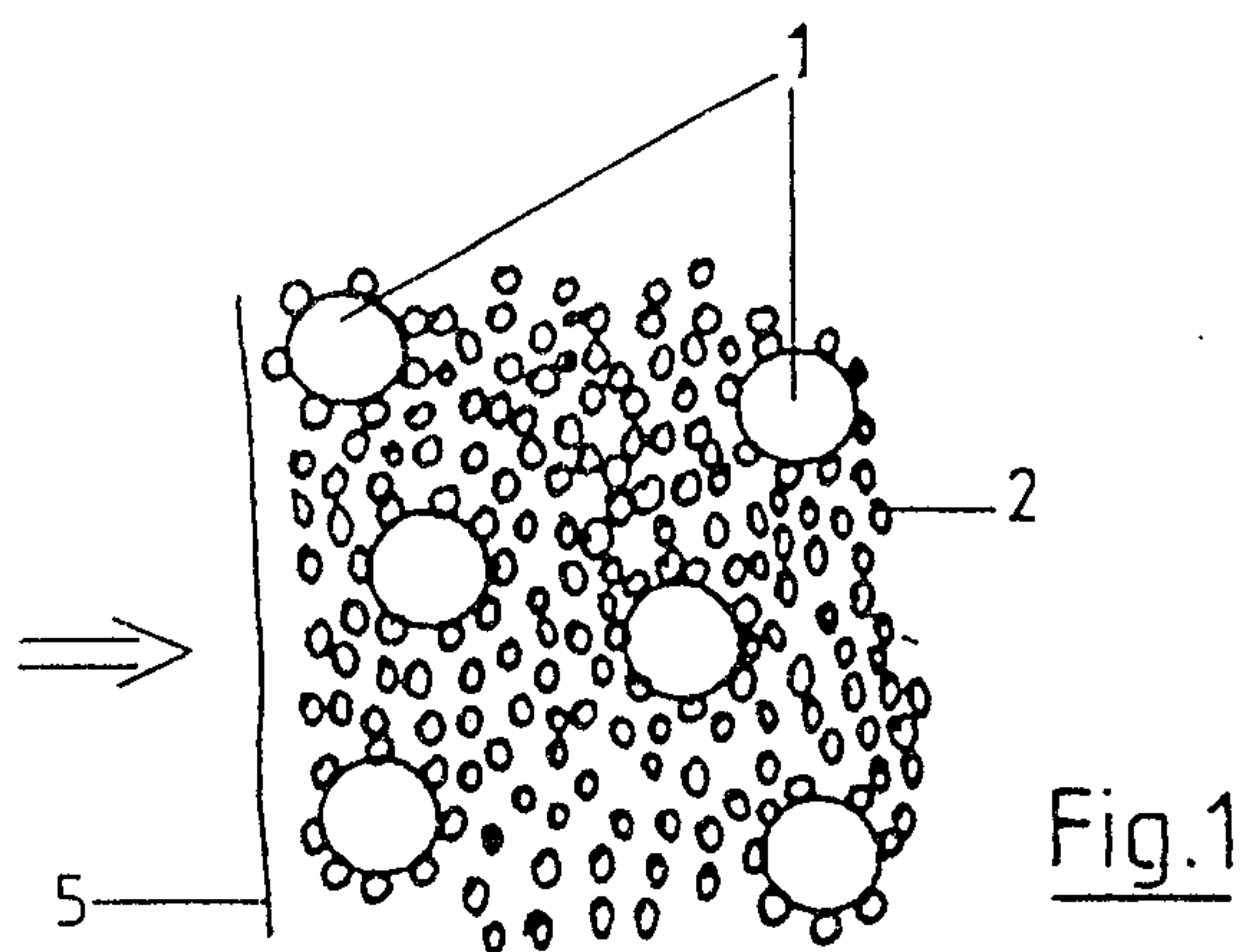
15. A filter or catalyst body according to one or more of claims 1 to 10, wherein the particles are made of a mixture of metal and plastic.

5 16. A filter or catalyst body according to one or more of claims 1 to 10, wherein the particles are made of a mixture of ceramic and plastic.

10 17. A filter or catalyst body according to one or more of claims 1 to 10, wherein the particles are made of a mixture of metal, ceramic and plastic.

15 18. A filter or catalyst body according to one or more of Claims 1 to 17,
wherein at least one of the woven cloth, braiding or knitted fabric and the particles comprises catalytic materials.

20 19. A filter or catalyst body according to Claim 18, wherein the catalytic materials are platinum, vanadium and rhodium.



PATENT AGENTS

Swaney Ogilvy Renault

