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(54) **Device for cleaning fine and uneven surfaces, especially Venetian blinds, of dust**

(57) Device for cleaning fine and uneven surfaces, especially Venetian blinds, of dust, that contains a body (1) which is hollow, has a shape of the letter C and whose inner space is divided by a dividing wall (4) into a suction channel (5) and an exhaust channel (6), which are interconnected through chambers located at the ends of the hollow body (1) and in which turbines (7) are mounted on bearings (8) and to which carriers (9) of a rotary brush (10) are attached, the rotary brush (10) being inserted into the carriers (9) such that it interconnects the ends of the hollow body (1); an outlet nozzle (3) is positioned at an outer side of the hollow body (1) and a suction nozzle (2) at an inner side of the hollow body (1), wherein the suction nozzle (2) is equipped with at least one opening for sucking an air stream with dust or other dirt from the cleaned object.

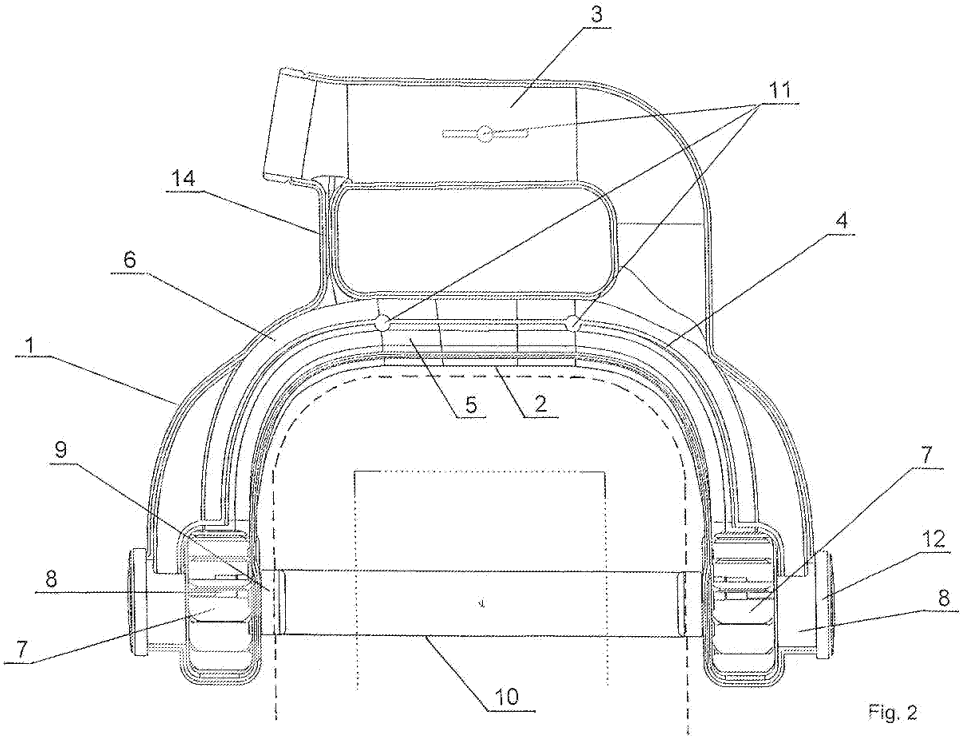

Fig. 2

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Description

Technical Field

[0001] The invention concerns a device for cleaning fine and uneven surfaces, especially Venetian blinds, of dust using a vacuum cleaner.

Background Art

[0002] To clean Venetian blinds of dust, there are often used brushes with antistatic fibres, consisting of a plastic handle equipped with embedded fine plastic fibres. By moving the hand, dust particles are attracted by means of antistatic energy. Subsequently, dust must be removed from these brushes. This kind of Venetian blinds cleaning is of low efficiency.

[0003] A further known device for cleaning Venetian blinds of dust consists of foam rubber brushes, which wipe the dust away from the Venetian blinds by surfaces of the foam rubber, pressed from both sides onto each slat of the Venetian blinds individually. Removing dust by these brushes is time-consuming, and cleaning of the foam rubber brushes is also time-consuming.

[0004] US 6,282,749 discloses a nozzle of a vacuum cleaner with a rotary brush, particularly of a rod shape, on which bristles are arranged into a spiral formation. Inside the nozzle body, there is arranged a rotor, which is rotated by the suction force of the vacuum cleaner, and a brush member or a paddle shaped member of a flexible material, for example rubber, which contacts the cleaned surface, is attached to the rotor. This vacuum cleaner nozzle is intended for carpet cleaning, and it is unsuitable for cleaning Venetian blinds, as they might be damaged.

[0005] JP 10309248 describes a device for hovering carpets with reduced noise level and simple construction. Both tips of the rotary brush ends are supported by bearings, A turbine is installed in a chamber, which is separated from the rotary brush by a partition. The suction openings match with the turbine. Nevertheless, only clean air is flowing through the suction openings, as these are located outside the area, from where dust and dirt are removed from the floor. Noiselessness of this device is ensured by using an acoustic material,

[0006] JP 2003325395 describes a suction tailpiece of a vacuum cleaner intended for cleaning surfaces of Venetian blinds without soiling and soaking one's hands. This device consists of a body equipped with a tailpiece to be connected to a vacuum cleaner and of rotary cleaning means, of which each contains a rotary shaft, pivoted in the device body at one of its ends, and further an elastic member for collecting dust - a brush formed so that it is projecting from the circumference of a part of the rotary shaft, projecting from the device body, and further it contains rotary driving means, like a turbine with a rotary cleaning means, pivoted in the device body, A passage is created inside the rotary shaft connected to the body tailpiece, which can be attached to the vacuum cleaner. A disadvantage of the device according to this document is that the body contains several gears to give all the cleaning means spin, thus decreasing its effectiveness and increasing its fault liability.

[0007] The aim of the present invention is to create a device for cleaning Venetian blinds of dust using a vacuum cleaner, which device can be easily operated, and simultaneously it exhibits high effectiveness and has simple construction.

Disclosure of Invention

[0008] The above mentioned disadvantages are eliminated to a great extent by a device for cleaning fine and uneven surfaces, especially of Venetian blinds, of dust according to the present invention, containing a body, a rotary brush, a suction nozzle and an outlet nozzle, and the subject-matter of which is that the body is hollow, it has a shape of letter C and its inner space is divided by a dividing wall to a suction channel and an exhaust channel, which are interconnected through chambers located at the ends of the body, in which turbines are accommodated in bearings, on which carriers of the rotary brush are attached, the rotary brush being mounted on the carriers so that it interconnects the body ends. The outlet nozzle is positioned from the outer side of the body and the suction nozzle from the inner side of the body, wherein the suction nozzle is equipped with at least one opening for taking away the air stream with dust or other dirt from the cleaned object.

[0009] To prevent dusting from the rotary brush, the body is equipped with deflector flaps to direct the air with dust or other dirt into the opening/openings of the suction nozzle.

[0010] The suction nozzle is equipped with at least one row of openings for sucking air with dirt from the surface of the cleaned objects. It is preferred, if the openings of the suction nozzle are of circular shape with a diameter of 3 to 10 mm. The openings of the suction nozzle may take also the form of slits.

[0011] All openings of the suction nozzle may be of the same size or they may be smaller at the periphery than the openings in the middle part of the suction nozzle.

[0012] The body of the device according to the present invention may be equipped at the outer side with a strengthening post, the other end of which is attached to the outlet nozzle. This creates a handle, facilitating manipulation with the device when used.

[0013] The turbine blades may be straight, radially projecting from the middle of the turbine. Nevertheless, it is preferred, if the turbine blades are bent against the direction of the turbine movement, wherein the turbine movement is brought about by the air streaming in the device according to the present invention and is caused by the suction force of the vacuum cleaner.

[0014] Essentially, the condition should be fulfilled that the area of the suction nozzle openings should be smaller or equal to the area of the outlet nozzle cross-section.

[0015] The rotary brush consists of the hollow body of the brush, which is equipped with fine bristles of a plastic having the width of 0.08 to 0.25 mm and length of 4 to 7 cm. It is preferable, if the rotary brush bristles in use are 2 to 10 mm away from the suction nozzle. The bristles on the rotary brush may be arranged in different ways. The rotary brush may contain one or more rows of bristle bundles spiraled around the brush body so that they form at least one thread or more threads, for example 1 to 10. The arrangement of bristles on the rotary brush may be also in rows. Important is that the bristles must be sufficiently fine and sufficiently long.

[0016] The device can be used with any kind of vacuum cleaner for cleaning, for example, Venetian blinds up to the width of the length of the rotary brush bristles.

An overview of figures in the drawings

[0017]

Fig. 1 shows the device according to the present invention, but without the rotary brush, Fig. 2 shows a section through the device body with indication of the length of the rotary brush bristles and with an exemplary arrangement of bristle bundles of the rotary brush on the brush body. Fig. 3 shows the rotary brush body without bristles, with turbines and entry nozzle. Fig. 4 shows the same section through the device body according to the present invention as Fig. 2, but air streaming is indicated by arrows, and the inner dividing wall of the device body according to the present invention is indicated by a heavy line for clarity.

Examples of invention embodiments

Example:

[0018] The device for cleaning Venetian blinds, as shown in Figs, 1 and 2, consists of a hollow body 1 having the shape of letter C, which is equipped with suction nozzle 2 and outlet nozzle 3, which, in use, is attached to the hose of a vacuum cleaner, not shown in the drawings. Inner space of the hollow body 1 is divided by a longitudinally arranged inner dividing wall 4 to a suction channel 5 and an exhaust channel 6. Suction channel 5 and exhaust channel 6 are interconnected by chambers, which are situated at both ends of the body and in which turbines 7 are accommodated in ball bearings 8, which are dustproof. Blades of the turbines 7 are arch-shaped to increase efficiency. Carriers 9 of the rotary brush 10 are attached to bearings 8. For easy and simple mounting, the device body is divided into halves, which are joined both by three connecting elements 11, for example in the form of screws, and by connecting covers 12 to enclose the chambers with turbines 7. Near the connection point to the hose of the vacuum cleaner, the outlet nozzle 3 is joined with the device body by a strengthening post 14, creating space allowing good grip for a hand, when used. Body 1 is at each of its sides equipped with one longitudinal deflector flap 13. These deflector flaps 13 direct the stream of the aspirated air and dust into the entry nozzle and through its openings into the suction channel 5.

[0019] When assembling the device for cleaning Venetian blinds, it is assembled from two halves of body 1, between which the part shown in Fig. 3 is inserted. The shown part consists of the rotary brush 10 with a hollow body, mounted on the carriers 9, which are connected to bearings 8 joined with turbines 7. On the same axis as carriers 9, there is attached an arched suction nozzle, equipped with a row of round openings for sucking air and dust from the cleaned objects.

[0020] Fig. 4 shows the function of the device according to the present invention. Suction force of the vacuum cleaner causes the turbines 7 and by means of bearings and carriers also the rotary brush 10 to spin. The fine bristles of the rotary brush 10 sweep dust from the cleaned objects, which dust is entrained by the air stream into the openings of suction nozzle 2, which stream gets into the suction channel 5 and through the chambers with turbines 7 into the exhaust channel 6 and further through the outlet nozzle to the space of the vacuum cleaner body, intended for dust and the like.

[0021] A device according to the present invention is mounted on the vacuum cleaner hose and grasped by hand at the outlet nozzle 3 so that fingers are inserted into the space created between the outlet nozzle 3, body 1 and the strengthening post. The rotary brush body in use should be perpendicular to the Venetian blind slats, and it is moved on them by a movement from left to right or from right to left. Dust from the Venetian blind slats is swept by the fine, long bristles of the rotary brush and entrained by the air stream, caused by the suction force of the vacuum cleaner, into the space of suction nozzle 2 under the deflector flaps 13, as already described.

List of reference signs

[0022]

1	device body
2	suction nozzle
3	outlet nozzle
4	dividing wall
5	suction channel
6	exhaust channel
7	turbine
8	bearings
9	carrier of the rotary brush
10	rotary brush
11	connecting elements
12	connecting cover
13	deflector flaps
14	strengthening post

Claims

1. Device for cleaning fine and uneven surfaces, especially of Venetian blinds, of dust, containing a body, a rotary brush, a suction nozzle and an outlet nozzle, **characterized in that**
body (1) is hollow, it has a shape of letter C and its inner space is divided by a dividing wall (4) to a suction channel (5) and an exhaust channel (6), which are interconnected through chambers located at the ends of the hollow body (1), in which turbines (7) are accommodated in bearings (8), on which carriers (9) of the rotary brush (10) are attached, the rotary brush (10) being inserted into the carriers (9) so that it interconnects the ends of the hollow body (1), the outlet nozzle (3) is positioned from the outer side of the hollow body (1) and the suction nozzle (2) from the inner side of the hollow body (1), wherein the suction nozzle is equipped with at least one opening for taking away the air stream with dust or other dirt from the cleaned object.

2. Device for cleaning fine and uneven surfaces according to claim 1,
characterized in that the hollow body (1) is equipped with deflector flaps (13) to direct the air with dust or other dirt into the opening/openings of the suction nozzle (2).

3. Device for cleaning fine and uneven surfaces according to claim 1 or 2,
characterized in that the suction nozzle (2) is equipped with at least one row of openings for sucking air with dirt from the surface of the cleaned objects.

4. Device for cleaning fine and uneven surfaces according to claim 3,
characterized in that the openings of the suction nozzle. (2) are Circular with a diameter of 3 to 10 mm.

5. Device for cleaning fine and uneven surfaces according to claim 3,
characterized in that the openings of the suction nozzle (2) are slits.

6. Device for cleaning fine and uneven surfaces according to claim 3, 4 or 5,
characterized in that all openings of the suction nozzle (2) are of the same size.

7. Device for cleaning fine and uneven surfaces according to claim 3, 4 or 5,
characterized in that the peripheral openings of suction nozzle (2) are smaller than the other openings of suction nozzle (2).

8. Device for cleaning fine and uneven surfaces according to claim 1,
characterized in that the hollow body (1) is equipped at the outer side with a strengthening post (14), the other end of which is attached to the outlet nozzle (3) to form a handle.

9. Device for cleaning fine and uneven surfaces according to claim 1,
characterized in that the rotary brush (10) is formed by a hollow body, to which bundles of fine bristles having the width of 0.08 to 0,25 mm and length of 4 to 7 cm are attached in at least one row or in a spiral so that they form 1 to 10 threads.

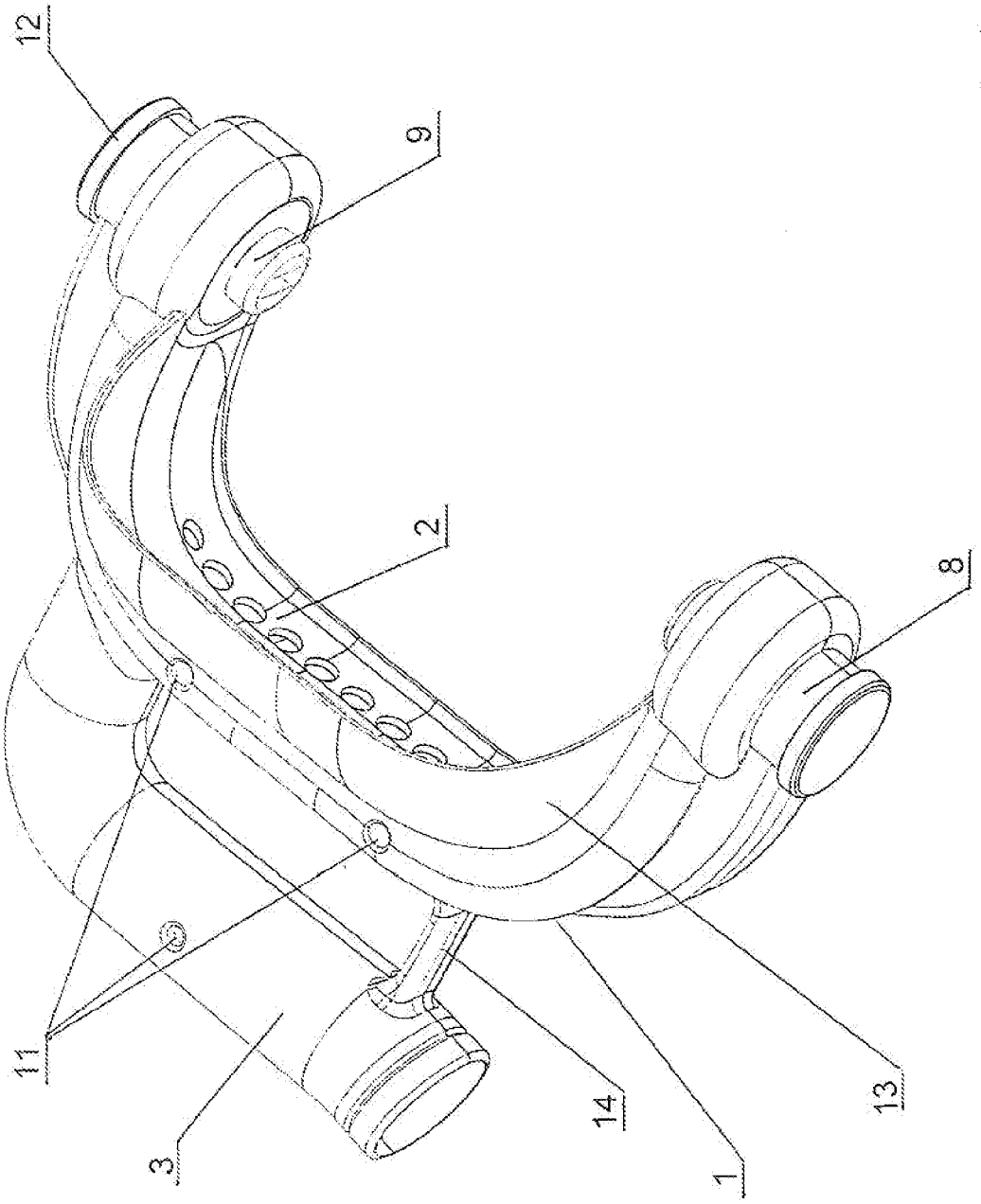

Fig. 1

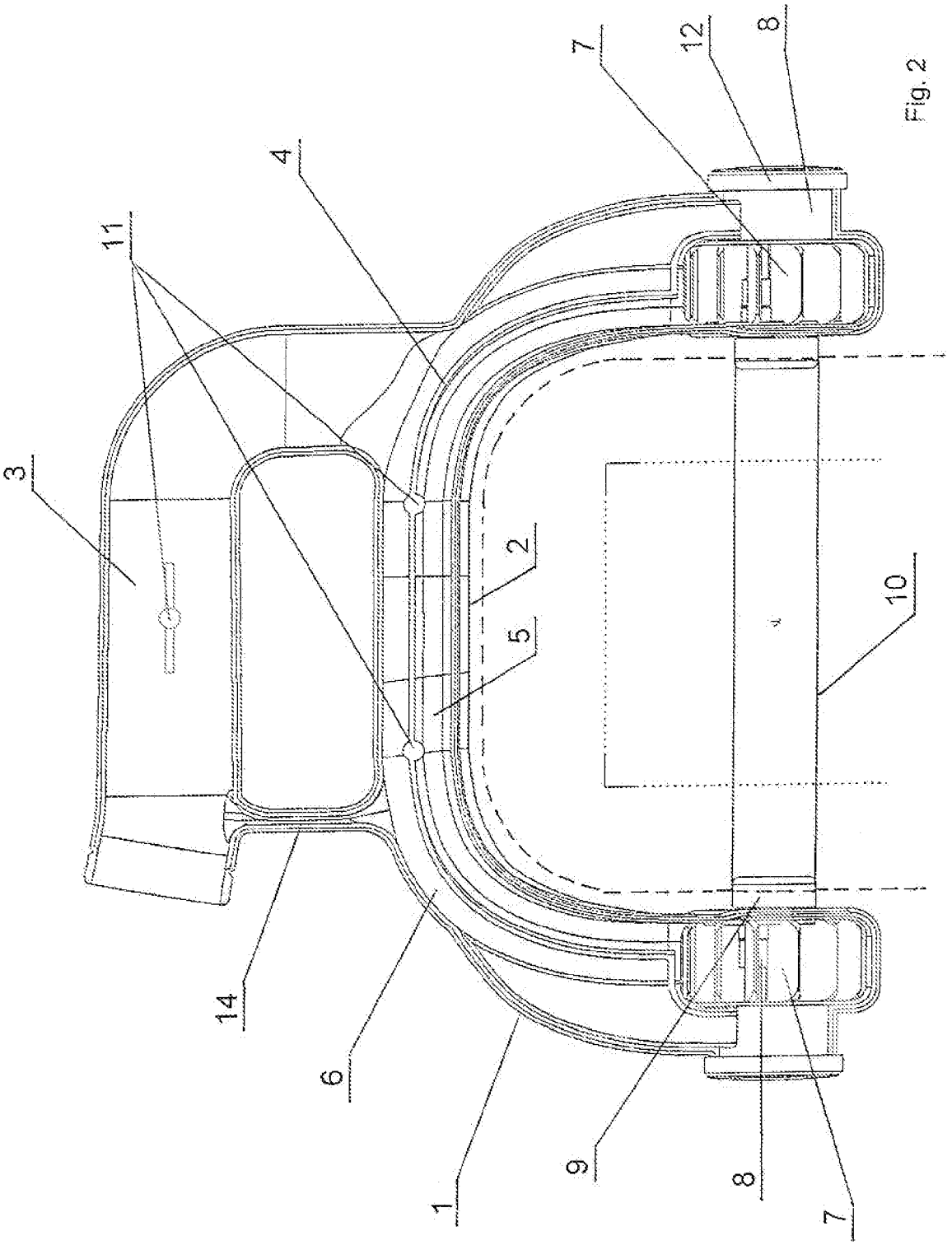

Fig. 2

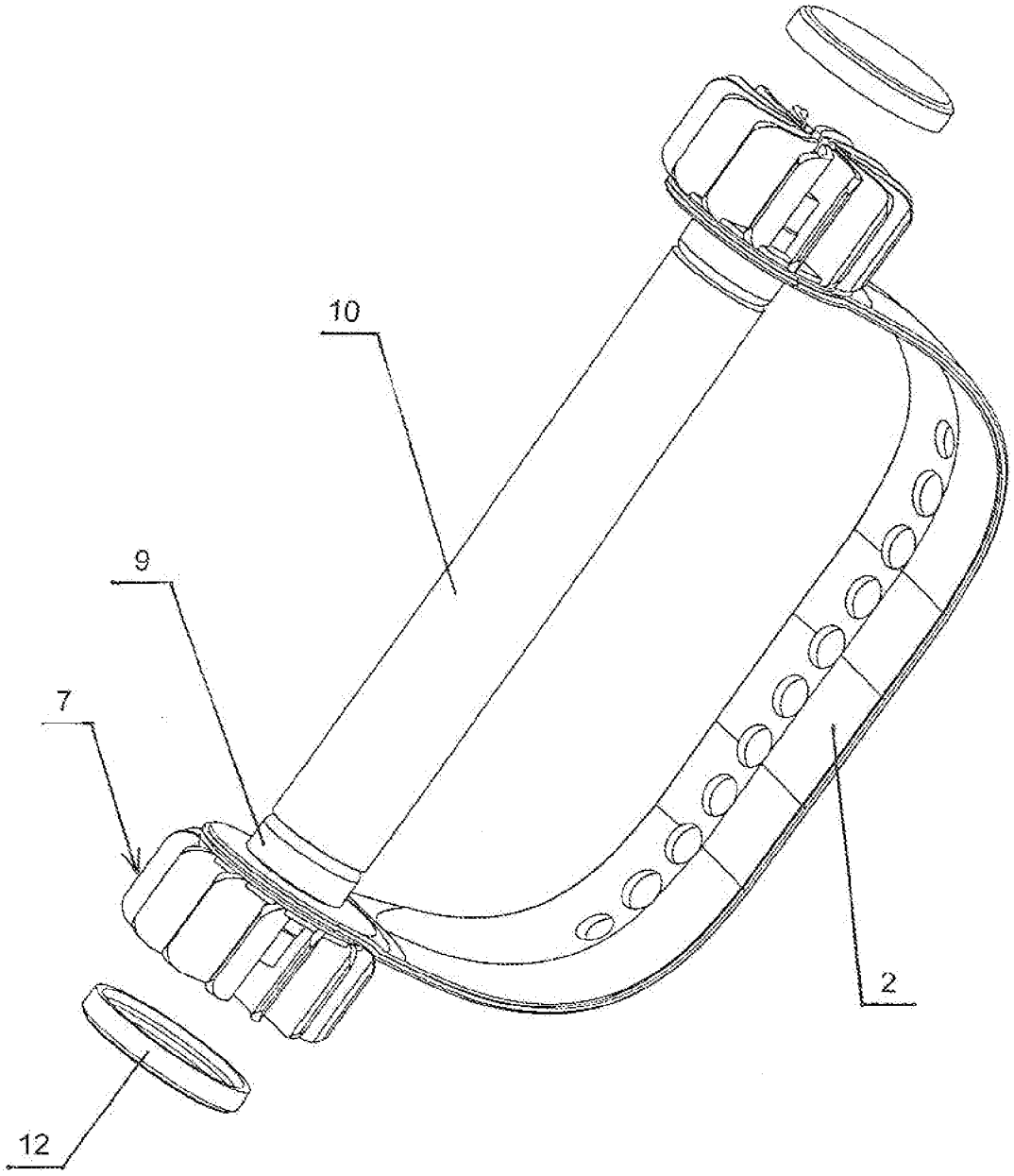

Fig. 3

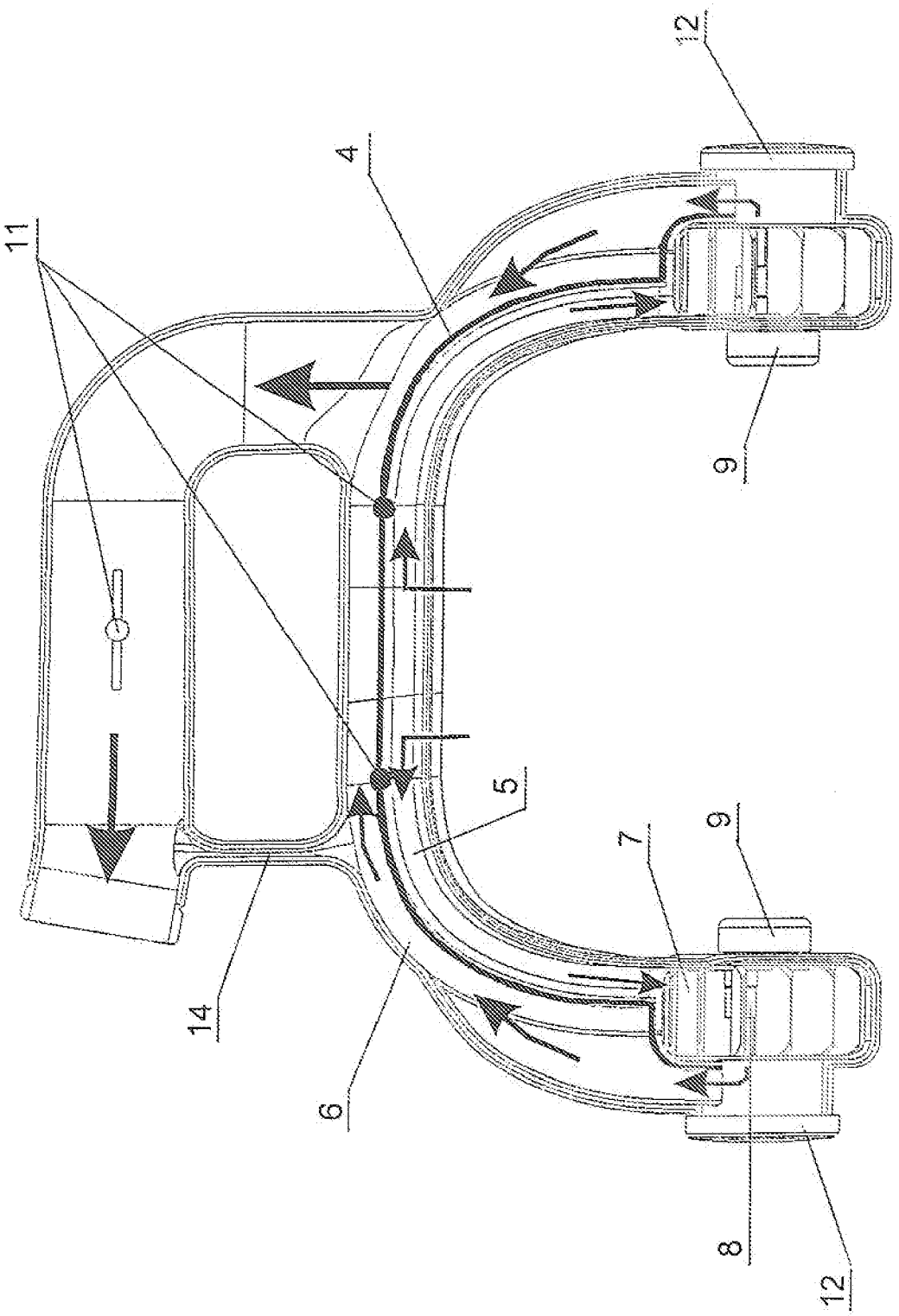

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6282749 B **[0004]**
- JP 10309248 B **[0005]**
- JP 2003325395 B **[0006]**