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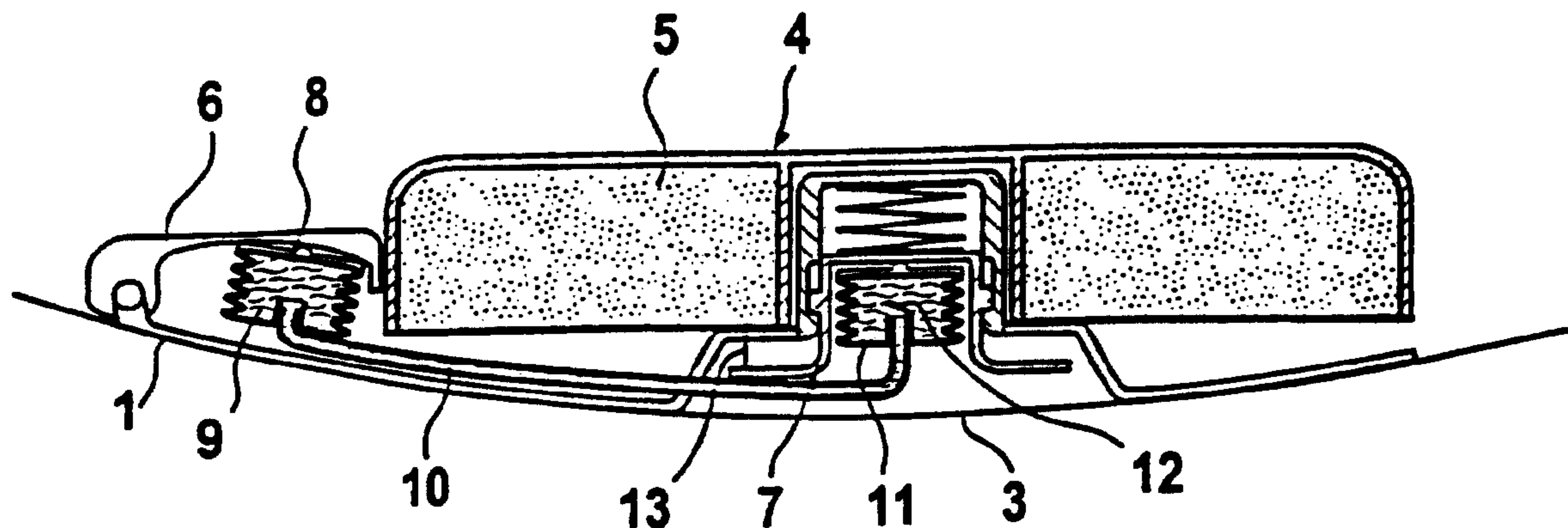
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(54) Titre : DISPOSITIF SERVANT A LA RECEPTION ET A LA DISTRIBUTION DOSEE D'AU MOINS UNE COMPOSITION ACTIVE DANS UN LAVE-LINGE, UN SECHE-LINGE OU UN LAVE-VAISSELLE
(54) Title: APPARATUS FOR HOLDING AND METERED DISPENSING OF AT LEAST ONE ACTIVE COMPOSITION INTO A WASHING MACHINE, A LAUNDRY DRYER OR A DISHWASHING MACHINE



(57) Abrégé/Abstract:

A device for the take up and dosed release of at least one active compound mixture in a washing machine, a dryer or a dish washer, characterized by the fact that it has at least two separate chambers for the take up of a dose of an active compound mixture respectively and an opening arrangement for the chambers, which is activated by means which in turn are activated by the conditions prevailing in the inside of the machine. The said conditions prevail solely in the course of a washing, drying or dish-washing cycle. The position of the opening device and/or the chamber(s) after emptying of at least one chamber are changed relative to each other such that, when another activation occurs, the opening device can then open at least one other chamber.



Abstract

A device for the take up and dosed release of at least one active compound mixture in a washing machine, a dryer or a dish washer, characterized by the fact that it has at least two separate chambers for the take up of a dose of an active compound mixture respectively and an opening arrangement for the chambers, which is activated by means which in turn are activated by the conditions prevailing in the inside of the machine. The said conditions prevail solely in the course of a washing, drying or dish-washing cycle. The position of the opening device and/or the chamber(s) after emptying of at least one chamber are changed relative to each other such that, when another activation occurs, the opening device can then open at least one other chamber.

Apparatus for holding and metered dispensing of at least one active composition into a washing machine, a laundry dryer or a dishwashing machine.

The invention relates to a device for containing and dispensing at least one active composition in doses into a washing machine, a dryer or a dish washer.

Already known from patent document DE 197 40 819 A1 is a metering and dispensing device inside a mechanism designed to add powdered detergent in doses to water-operated washing machines, being provided with two compartments disposed in one plane for receiving the powdered detergent, which is discharged into a processing container of the washing machine, the compartments having filling openings through which any individual or all of the compartments can be selectively filled with the powdered detergent and which communicate with an outlet opening of a funnel-shaped detergent hopper mechanism and simultaneously serve as individually activatable openings for the purpose of dispensing to the rinsing or washing water, co-operating with synchronously controllable outlet openings for the water admixed with the powdered detergent. The individual doses of detergent are discharged by a manual setting operated by the user or an operating programme selected by the user.

Patent document US 4,379,515 discloses a dispensing device for detergent, comprising a rigid container and, communicating with this rigid container by means of a pipe, a compressible reservoir containing the measured quantity of detergent needed for one washing cycle. Under the effect of centrifugal forces generated by rotation of the laundry drum, the reservoir is compressed - particularly if it is disposed between the laundry and the wall of the laundry drum - in such a way that its contents are emptied into the rigid container, where the detergent is then dissolved by the washing liquor. A disadvantage of this dispensing system resides in the fact that the reservoir can be used for only one respective washing cycle and has to be replaced with each new washing cycle.

Patent document EP 0 215 366 describes a detergent container with a welded seal, whereby the welded seal melts at a specific operating temperature and then releases the detergent. The seal of the container in particular can not be used again and in addition it is not possible to dispense

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more than once with this system.

Patent document EP 0 328 769 describes a removable dispensing container with a closure that can be opened during a washing cycle and which has a manipulating
5 extension. The pressure exerted by the laundry during the washing cycle causes the manipulating extension to be pushed into the dispensing container in such a way that the detergent is able to flow out. It is not possible to dispense more than one dose and the dispensing container
10 must be filled again before each washing cycle.

Patent document DE 39 02 356 discloses a dispensing container which may be used for a single washing cycle only and operates on the basis of a temperature-dependent release of a liquid fabric conditioner. The
15 rising temperature causes the pressure in the dispensing container to rise above

atmospheric pressure, as a result of which a gate valve is displaced into its open position, permitting the liquid fabric conditioner to flow into the washing machine.

Patent document US 5,033,643 describes a dispensing container which also allows a metering unit to be released for only one washing cycle. Forces generated by the wet laundry act on the release mechanism of the dispensing container.

Patent documents DE 39 34 123 and DE 39 22 342 describe detergent containers which are fixedly mounted on the laundry drum. Pins or locking hooks are used for fixing purposes. With these containers, no provision is made for more than one dose, which means that they have to be removed from the washing machine after every washing cycle and re-filled.

Patent document US 5,176,297 describes a dispensing system for a dish washer, which is mounted in the interior of the machine and incorporates a supply and a dispensing compartment. Although it is possible to dispense more than one dose, the dispensing system is controlled by the dish washer in a complex manner.

Patent document DE 195 40 608 discloses a system enabling more than one dose to be dispensed, in which tablets of dish washer detergent are placed, whereby the individual doses are controlled by a command issued by the dish washer, i.e. an operating programme of the dish washer selected by the user controls the time at which the dose is released.

Patent document AU-A-78393/91 discloses a dispensing container for a detergent which is dispensed through an orifice opened by the build-up of internal pressure in the container. This internal pressure is generated either by the operating programme of the machine or by operation directly on the part of the user.

Summing up the state of the art, dispensing systems are known which primarily permit individual doses to be dispensed and in a few cases multiple doses.

In systems permitting a single dose, the release of detergent is generally operated on the basis of a delayed release which may be triggered by means of a rise in temperature, an increase in pressure or centrifugal forces, for example.

What systems permitting multiple doses have in common is that the release is mechanically triggered (valve, piston, gate, etc.) either on the basis of a command issued by the washing programme of the machine or by direct operation on the part of the user.

The underlying objective of the invention is to propose a device for containing and dispensing at least one active composition in doses into a washing machine, a dryer or a dish washer, which enables more than one dose to be dispensed (in either one or more washing, drying or dish washer rinse cycles) and is triggered independently of the commands of an operating programme in the machine or intervention by the user.

This objective is achieved by the invention due to at least two separate compartments for receiving and respectively dispensing at least one active composition and an opening mechanism for the compartments which is operated by means that are activated by conditions prevailing in the interior of the machine and which occur exclusively during a washing, drying or dish-washing cycle, whereby the position of the opening mechanism and/or the compartment(s) relative to one another is altered after at least one respective compartment has been emptied, thereby enabling at least one other respective compartment to be opened by the opening mechanism when activated again.

A preferred embodiment is characterised by a first bellows; a second bellows; a connecting pipe with a one-way valve which connects the two bellows to one another; a hydraulic fluid which is released from the first bellows into the second bellows causing the latter to expand, the opening mechanism being connected to the second bellows in such a way that it is raised due to the expansion of the second bellows, the opening mechanism being so designed that its lifting action causes the compartment(s) to open to the degree that the compartment contents can be

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substantially entirely dispensed into the machine; as well as means which enable the hydraulic fluid gradually to leave the second bellows and a return mechanism connected to the opening mechanism which enables the opening mechanism to be
5 re-positioned as the hydraulic fluid gradually leaves the second bellows, the opening mechanism being guided into a position such that, when activated again, the or other compartment(s) can be opened in the same manner.

In accordance with an aspect of the invention,
10 there is provided device for intake and closed delivery of at least one active composition into a washing machine, a tumble dryer or a dishwasher, containing at least two separate chambers each for receiving a dose of at least one active composition; and an opening device for the chambers,
15 wherein the opening device is actuated by means within the device, which are activated by conditions inside the machine, which exist exclusively during a washing, drying or dishwashing cycle, wherein a position, of at least one of the opening device and of at least one chamber of the at
20 least two chambers after emptying in each case of the at least one chamber relative to one another is altered so that on re-activation the opening of in each case at least one further chamber by the opening device is made possible, wherein the opening device is provided with a blade or a
25 spike, which damages the at least one further chamber containing a single dose of the active composition, so that the at least one further chamber is torn open and releases its contents into the machine.

In accordance with an aspect of the invention, the
30 release of hydraulic fluid from the first bellows to the second bellows is operated, directly or indirectly, by rotation of the device with the washing machine or dryer drum.

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In one especially preferred embodiment of the invention, as the device is rotated with the washing machine or dryer drum, a pivotably secured weight compresses the first bellows, causing the hydraulic fluid to be released to the second bellows.

In an alternative embodiment of the invention, the hydraulic fluid is released from the first bellows to the second bellows due to the wet laundry or dry laundry compressing the first bellows directly or indirectly.

Another embodiment of the invention is characterised by the fact that the opening mechanism is raised, directly or indirectly, by means which are altered in form, at least to a certain degree, when the temperature is increased until at least one compartment has been opened wide enough for the compartment contents to be essentially entirely released into the machine and the means undergo the reverse change of form, at least to a certain degree, on cooling so that the opening mechanism is guided into a position from which the or other compartment(s) can be opened in the same manner when activated again.

An alternative to this embodiment of the invention is characterised by a rigid compartment with a material disposed therein which expands as the temperature increases and shrinks on cooling, in particular a wax.

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By preference, the opening mechanism is raised by means of a flexible diaphragm which responds to the expansion of the material.

Another alternative to the embodiment of this invention which reacts to the effect of temperature is characterised by a bimetallic unit, which bends when the temperature increases and returns to shape on cooling.

By particular preference, the opening mechanism is guided into its new position by means of a key groove and a nose co-operating therewith.

The opening mechanism preferably has at least one blade or a spike.

In one particularly practical arrangement, a device is firmly but detachably secured in the interior of the machine.

By preference, the device comprises a cartridge with four to fifteen, more preferably ten, compartments, the compartments preferably being laid out in a circular arrangement in the cartridge.

An embodiment of the invention will be described below with reference to the appended drawings.

Of these:

Fig. 1 shows a vertical cross section through one embodiment of the device proposed by the invention in a non-dispensing state;

Fig. 2 illustrates the embodiment of the device illustrated in Fig. 1 in a dispensing state;

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Fig. 3 is a plan view of an embodiment of the device proposed by the invention;

Fig. 4 is a plan view of another embodiment of the device proposed by the invention;

Fig. 5 is a partial view in vertical cross section of another embodiment of the device proposed by the invention;

Fig. 6 is a vertical cross section of yet another embodiment of the device proposed by the invention, shown in a non-dispensing state;

Fig. 7 depicts the embodiment of the device illustrated in Fig. 6 in a dispensing state; and

Fig. 8 is an enlarged view of the mechanism of the rotating blade for opening the individual compartments.

Turning more specifically to Figs. 1 and 2, a device as proposed by the invention consists of a base plate 1 which is securely (but detachably) fastened by means of a holder (e.g. locking hooks or expanding pins) in the machine, e.g. on the inside wall 3 of a laundry drum, and a cartridge 4 comprising, for example, ten compartments 5 for receiving at least one active composition. The base plate 1 additionally has a pivotably mounted release mechanism 6 and a rotating opening mechanism 7 for opening the individual compartments. The compartments 5 in the cartridge 4 are arranged in a circle (Fig. 3).

With the embodiment illustrated in Figs. 1 and 2, wet laundry or dry laundry exerts pressure on the release mechanism 6, in particular due to the rotation of the washing machine or dryer drum. As a result, a first bellows 8 disposed underneath is compressed and the hydraulic fluid 9 (preferably water) disposed in the bellows is released through a connecting pipe 10 to a second bellows 11. As this happens, the hydraulic fluid 9 flows through a one-way valve 12, which

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prevents the fluid from flowing back out of the second bellows 11. As the bellows 8 is compressed, the second bellows 11 expands in stages.

In an alternative embodiment (Fig. 4), the rotation of the washing machine or dryer drum pushes a pivotably suspended weight 18 against the first bellows 8, thereby causing the hydraulic fluid 9 disposed in the bellows to be released into the second bellows 11 in the same manner.

As it expands, the second bellows 11 raises an opening mechanism 7 with a blade or a spike 13, which then damages a compartment 5 containing an individual dose of active compound in such a way that it is torn open and its contents are released into the machine. The important factor is that the material encasing the compartment should be of an appropriate type which can be opened by the blade or spike 13. This encasing material (e.g. thin plastic film) should therefore be easy to puncture or pierce.

It goes without saying that the opening mechanism 7 may also be designed so that it has more than one blade or spike 13 in order to damage and hence open either one compartment at several points or several compartments simultaneously. The latter situation would enable different active compositions contained in different compartments to be dispensed simultaneously or allow incompatible components to be kept separate from one another.

Once the compartment has been emptied, the hydraulic fluid 9 is slowly able to flow out of the second bellows 11 through a small orifice 14, causing the opening mechanism to be lowered by means of a return spring 15 and at the same time placed by means of a key groove and a nose 17 co-operating therewith (zig-zag mechanism) (Fig. 8) in a position from which one or several other compartment(s) 5 may be opened on re-activation. Once all compartments 5 of the cartridge 4 are spent, the latter can easily be replaced by a new one.

In one embodiment of the invention, the opening mechanism can be re-positioned by dimensioning the orifice 14 or return force of the spring 15 accordingly so that this repositioning

action does

not take place until completion of the washing, drying or dish-washing cycle, i.e. only one respective compartment is opened during a cycle. In this embodiment, the compartments usually contain the same active composition and do so in a respective amount specifically measured for one cycle.

In another embodiment of the invention, consecutive compartments 5 of the cartridge 4 are filled with different compositions and are opened one after the other during a cycle. For example, a first compartment might be filled with a detergent for the main washing cycle of a washing machine and the subsequent compartment with a fabric conditioner for a rinsing cycle.

The dimensioning of the orifice 14 and the return force of the spring 15 must be selected so that the opening mechanism is repositioned on completion of the main washing cycle to enable renewed activation during the rinsing cycle. It would also be conceivable to operate several activations during one phase of the washing, drying or dish-washing cycle, provided steps are taken to ensure that the hydraulic fluid can flow back out of the bellows 11 relatively quickly in order to guarantee that the opening mechanism can be activated rapidly again.

If the cartridge 4 contains several compartments with different compositions which are to be released during a single washing, drying or dish-washing cycle, these compartments need not necessarily be of the same size. Accordingly, the compartments may be designed as illustrated in Fig. 5. The mechanism for guiding the opening mechanism 7, such as the aforementioned zig-zag mechanism for example, may also be designed so that the opening mechanism 7 is guided into the correct respective position for opening the next compartment even if the compartments 5 are of a different design. If a cartridge incorporates compartments with different compositions intended to be released within one cycle, steps must be taken (for example by means of an indentation or similar) to ensure that the cartridge 4 is always attached to the base plate 1 in the correct position from which the dispensing sequence will be correctly timed.

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In another embodiment of the invention (illustrated in Figs. 6 and 7), the system is activated depending on temperature. To this end, a rigid compartment 20 is disposed underneath the opening mechanism 7 and contains a material 21 which expands when the temperature increases, such as a wax, for example. When the washing or dish-washing water or interior of the dryer is heated to the desired operating temperature, the wax 21 expands and pushes the opening mechanism 7 upwards, either directly or indirectly via a flexible diaphragm 22. In the same way as described with reference to the embodiment illustrated in Figs. 1 and 2, this enables the opening mechanism 7 to open at least one of the respective compartments 5, e.g. by means of a blade or spike 13. As the wax 21 cools, the opening mechanism 7 is duly lowered and is moved into the next position, for example by means of a zig-zag mechanism as described above. For the sake of simplification, this mechanism is not illustrated in the schematic diagrams of Figs. 6 and 7. The described temperature-dependent system is particularly well suited for use in a dryer if it is desirable for the release of the compartment contents to be delayed or in a dish washer which does not have a rotating drum.

In an alternative embodiment (which is not illustrated), the system may also be activated on the basis of temperature by providing a bimetallic unit which bends as the temperature increases, thereby directly or indirectly raising the opening mechanism in the same manner as the wax 21 described above. On cooling, the bimetallic unit likewise returns to its initial shape so that the opening mechanism can be guided into its new position.

In the case of dish washers, the temperature is normally increased twice during a dish-washing cycle, namely once during the cleaning cycle and a second time during the rinsing cycle. The temperature-dependent embodiments of the system proposed by the invention would therefore be activated twice, i.e. an appropriate substance would be released into the dish washer twice. This might be a rinsing agent in both cases. However, it would also be conceivable, as an alternative, to provide one compartment with a dish-washer detergent and one with a rinsing agent so that the dish-washer detergent is dispensed during the washing cycle and the rinsing agent during the rinsing cycle.

It goes without saying that within the scope of the main claim, which defines the essential elements of the invention, other embodiments would also be conceivable. For example, instead of breaking the encasing material by means of a blade or spike, it would be conceivable for the opening mechanism simply to press against a perforation that would tear under the effect of this pressure. This being the case, a stronger material could be used for the material encasing the compartment.

The described zig-zag mechanism of FIG. 8, where a nose 17 is guided in a key groove 16 of matching design as the opening mechanism is being raised and lowered into a position enabling the individual compartments of the apparatus to be opened, is also given solely by way of example, and a person skilled in this art would have no difficulty in finding other means that would fulfil the same purpose.

As an alternative, the invention also proposes that, instead of moving the actual opening mechanism (for example by means of the zig-zag mechanism illustrated in detail) it would be possible to move the compartments 5, by rotating the cartridge 4 for example, to permit another compartment to be opened by the opening mechanism 7, which would be stationary in this situation. Clearly, it would also be conceivable to displace both the opening mechanism 7 and the compartments 5 in order to move the opening mechanism 7 and the next compartment 5 to be opened into the correct position relative to one another.

The active compound(s) contained in the compartments may be of different types. In a washing machine application, the compartments might contain detergent, water softener, fabric conditioner, etc., individually or in combination. In the case of dryers, it would be conceivable to use specific substances for impregnating and/or conditioning fabrics, for example. For dish washer applications, dish washer additives and rinsing agents could be used in particular.

Clearly, the active compounds contained in the compartments are not restricted to liquids. The compartments could also contain a pasty, granular or powdered material or alternatively a

composition in tablet format. When the material encasing the compartments is torn, washing or dish-washing liquor (at least in washing machine or dish washer applications) would then penetrate the compartment and dissolve or rinse out the composition disposed in it. This could have an additional advantage over liquids since the contents could be released on a delayed basis.

It is of advantage to provide means for inactivating the system, preferably of the type which do not have to be removed from the machine, so that the user can decide whether to run the machine with the system proposed by the invention in the activated state or in the non-activated state. Any type of locking mechanism that would prevent the opening mechanism 7 from being raised could be used for this purpose, preferably a system of locking the release mechanism 6 or the cartridge 4.

The features of the invention disclosed in the description above, the drawings and the claims may be construed as essential to the invention in its different embodiments, both individually and in any combination.

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CLAIMS:

1. Device for intake and closed delivery of at least one active composition into a washing machine, a tumble dryer or a dishwasher, containing at least two separate
5 chambers each for receiving a dose of at least one active composition; and an opening device for the chambers, wherein the opening device is actuated by means within the device, which are activated by conditions inside the machine, which exist exclusively during a washing, drying or dishwashing
10 cycle, wherein a position, of at least one of the opening device and of at least one chamber of the at least two chambers after emptying in each case of the at least one chamber relative to one another is altered so that on re-activation the opening of in each case at least one further
15 chamber by the opening device is made possible, wherein the opening device is provided with a blade or a spike, which damages the at least one further chamber containing a single dose of the active composition, so that the at least one further chamber is torn open and releases its contents into
20 the machine.

2. Device according to claim 1, further comprising a first bellows; a second bellows; a connecting line with a one-way valve, which joins the two bellows together; a hydraulic fluid, by whose release from the first bellows to
25 the second bellows the latter is expanded, wherein the opening device is connected to the second bellows in such a way that the opening device is lifted by the expansion of the second bellows, and the opening device is designed in such a way that as the opening device is lifted, the at
30 least one further chamber is opened so that the chamber contents are releasable essentially completely into the machine; and discharge means which permit the gradual discharge of the hydraulic fluid from the second bellows,

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and a resetting device which is connected to the opening device and permits the resetting of the opening device on gradual discharge of the hydraulic fluid from the second bellows, the opening device being moved into a position such
5 that on renewed activation at least one additional chamber can be opened in the same way.

3. Device according to claim 2, wherein the delivery of the hydraulic fluid from the first bellows to the second bellows is effected directly or indirectly by the rotation
10 of the device with the drum of the washing machine or tumble dryer.

4. Device according to claim 3, wherein through the rotation of the device with the drum of the washing machine or tumble dryer, a swivel-mounted weight squeezes the first
15 bellows so that the hydraulic fluid is delivered to the second bellows.

5. Device according to claim 3, wherein the hydraulic fluid is delivered from the first bellows to the second bellows because the first bellows is squeezed directly or
20 indirectly by the material being washed or dried.

6. Device according to claim 1, wherein the opening device is lifted directly or indirectly by temperature means which undergo a change of shape at least partially when the temperature rises, so that at least one chamber is opened
25 widely enough for the chamber contents to be released essentially completely into the machine, and on cooling, the temperature means at least partially undergo an essentially opposite change of shape and the opening device is moved into a position such that on renewed activation the at least
30 one additional chamber can be opened in the same way.

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7. Device according to claim 6, further comprising a rigid chamber with a material inside, which expands when the temperature rises and contracts as it cools down.

8. Device according to claim 7, wherein the material
5 comprises a wax.

9. Device according to claim 7 or 8, wherein the opening device is lifted via a flexible diaphragm which reacts to the expansion of material.

10. Device according to claim 6, further comprising a
10 bi-metal unit, which bends as the temperature rises and is restored on cooling.

11. Device according to any one of claims 1 to 10, wherein the opening device is moved into its new position via a keyway and a key head that interacts therewith.

15 12. Device according to any one of claims 1 to 11, wherein the opening device comprises at least one blade or spike.

13. Device according to any one of claims 1 to 12, wherein the device is fastened firmly, but detachably,
20 inside the machine.

14. Device according to any one of claims 1 to 13, wherein the device comprises a magazine with four to fifteen chambers.

15. Device according to claim 14, wherein the device
25 comprises a magazine with ten chambers.

16. Device according to claim 14 or 15, wherein the chambers are arranged in a circle in the magazine.

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Fig. 1

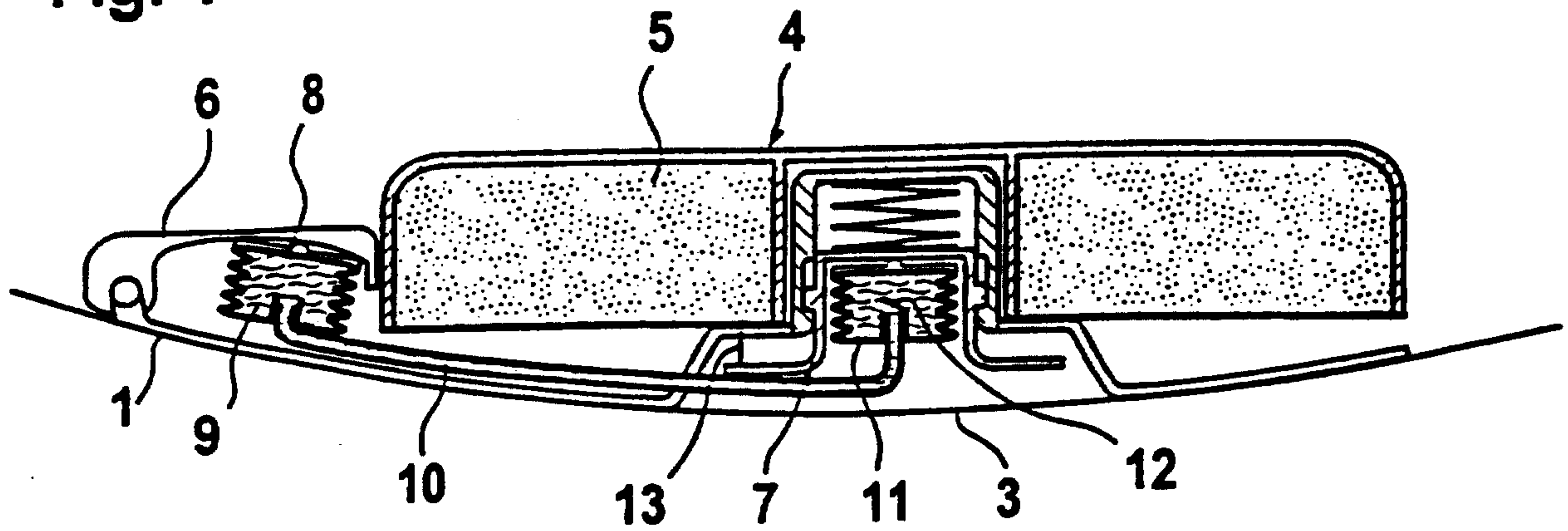


Fig. 2

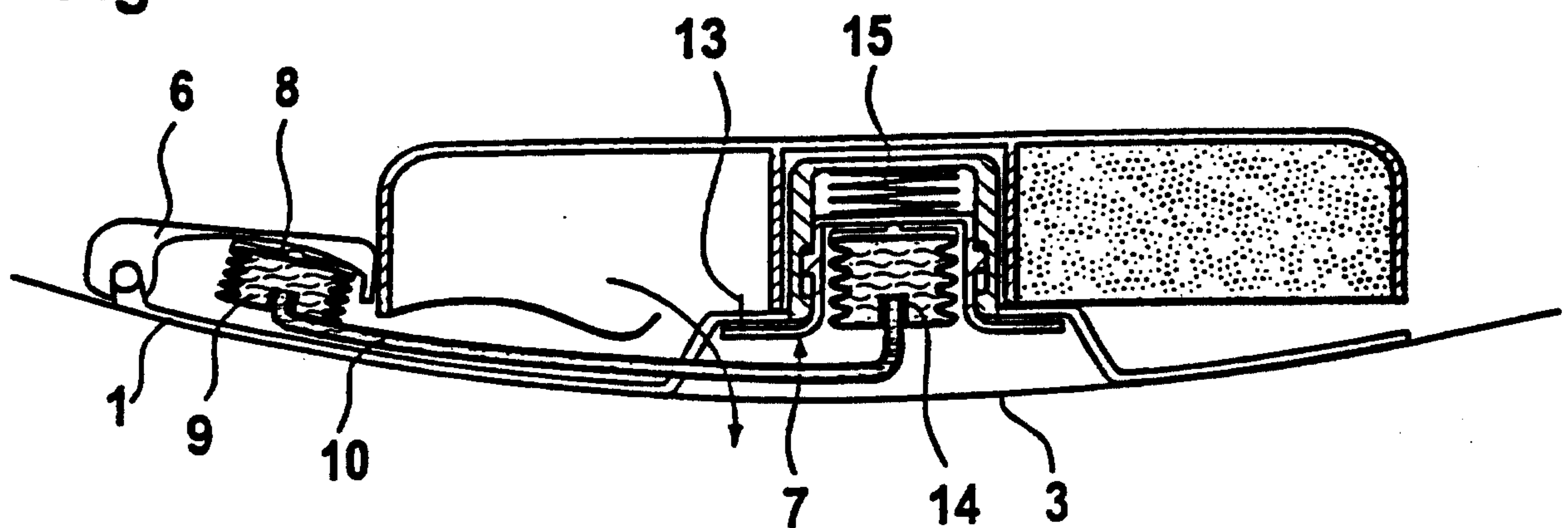
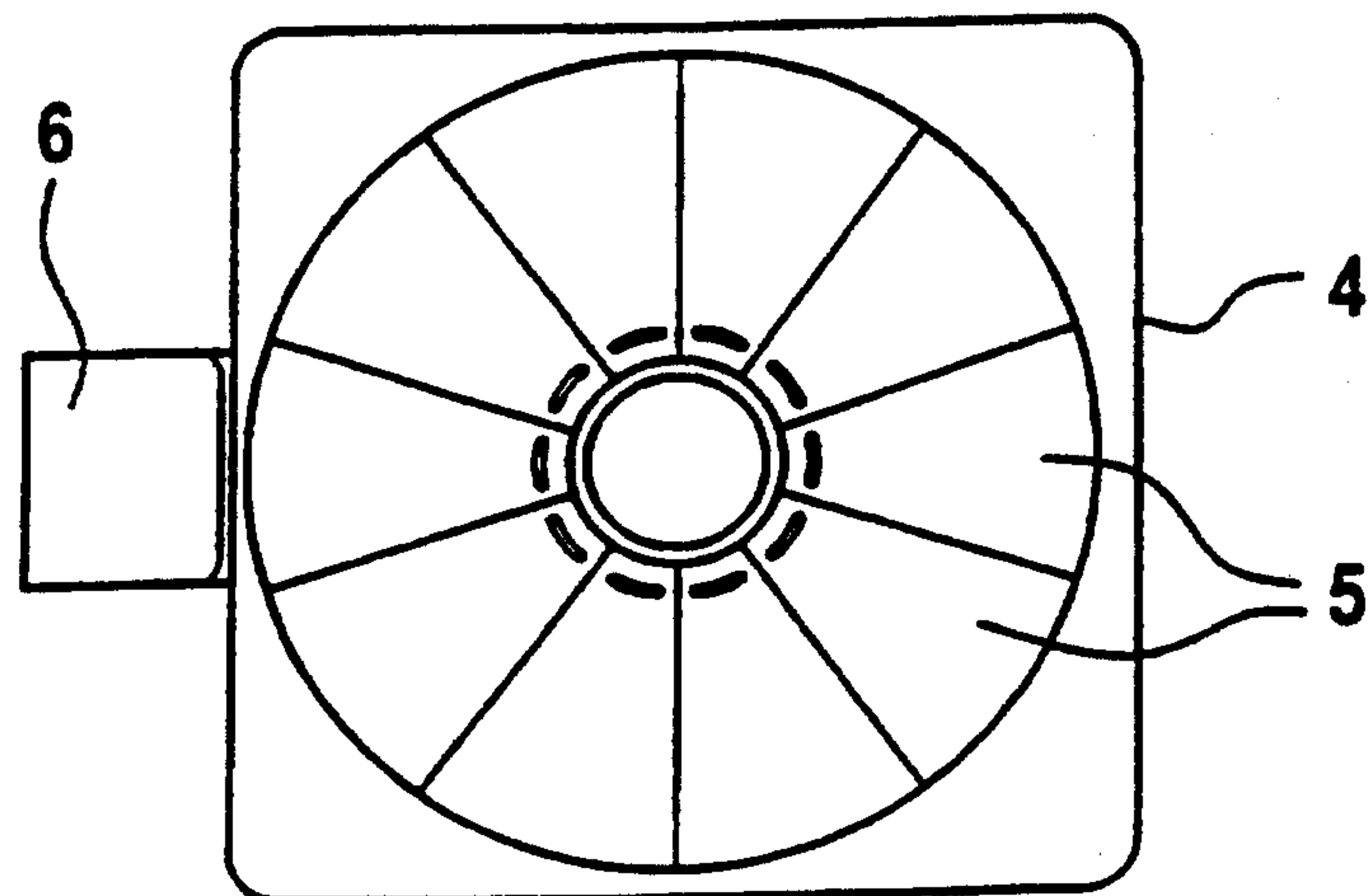


Fig. 3



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Fig. 4

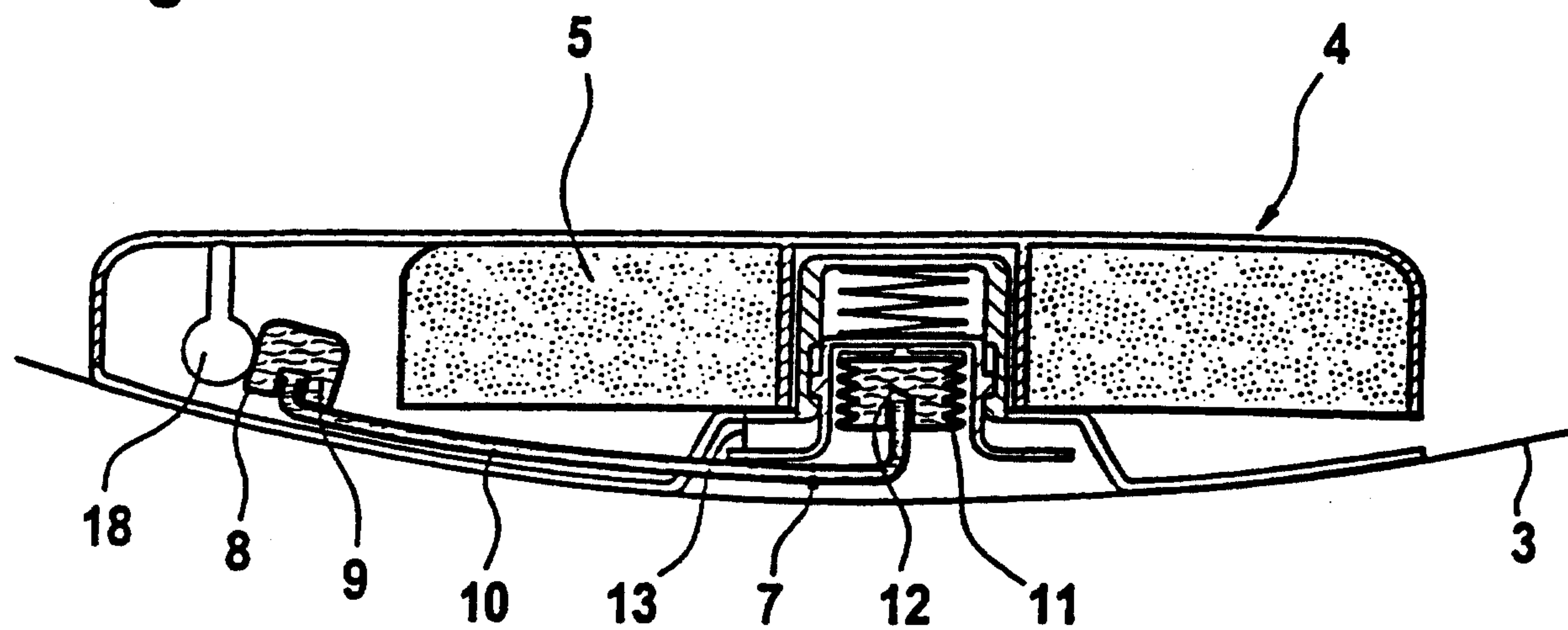
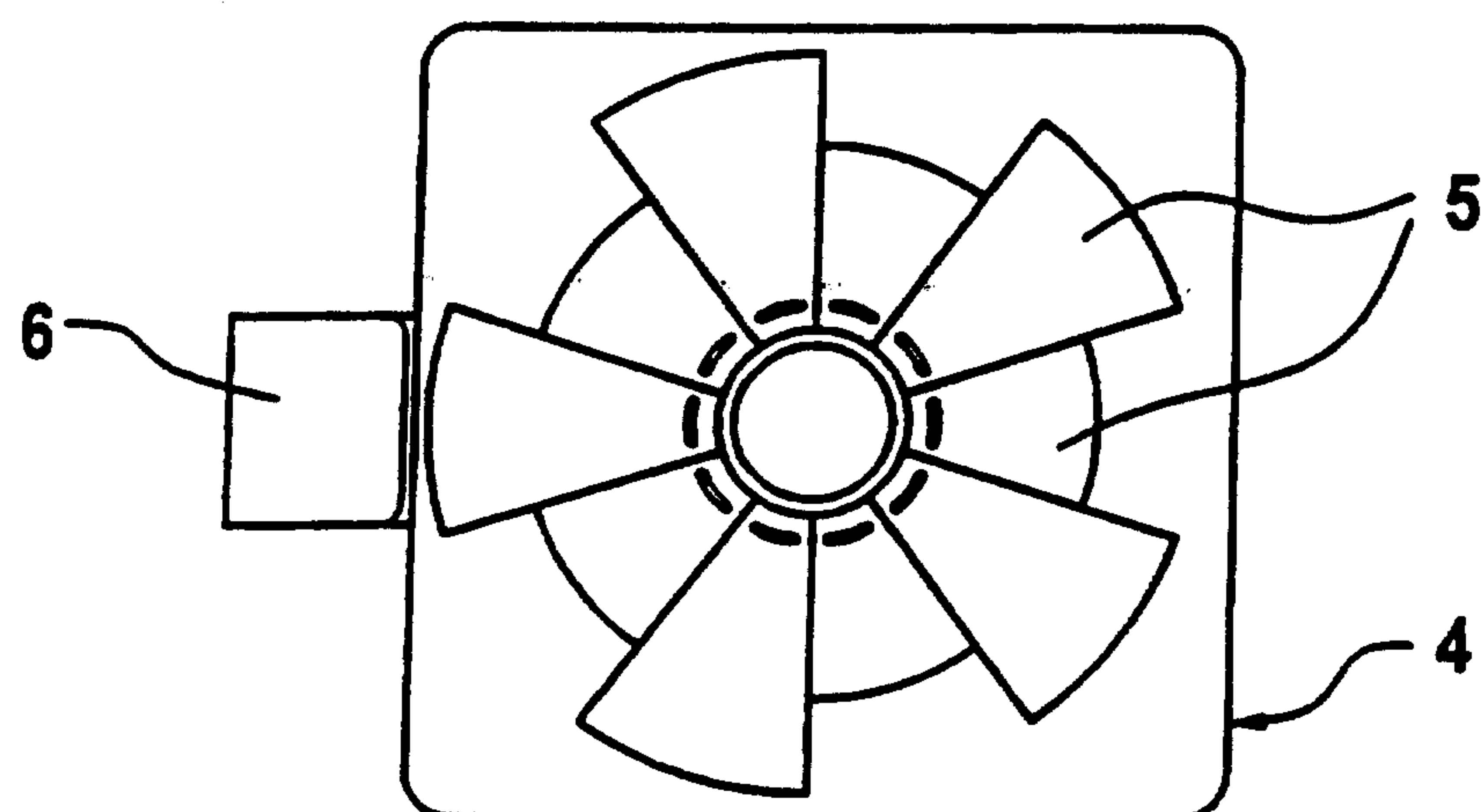


Fig. 5



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Fig. 6

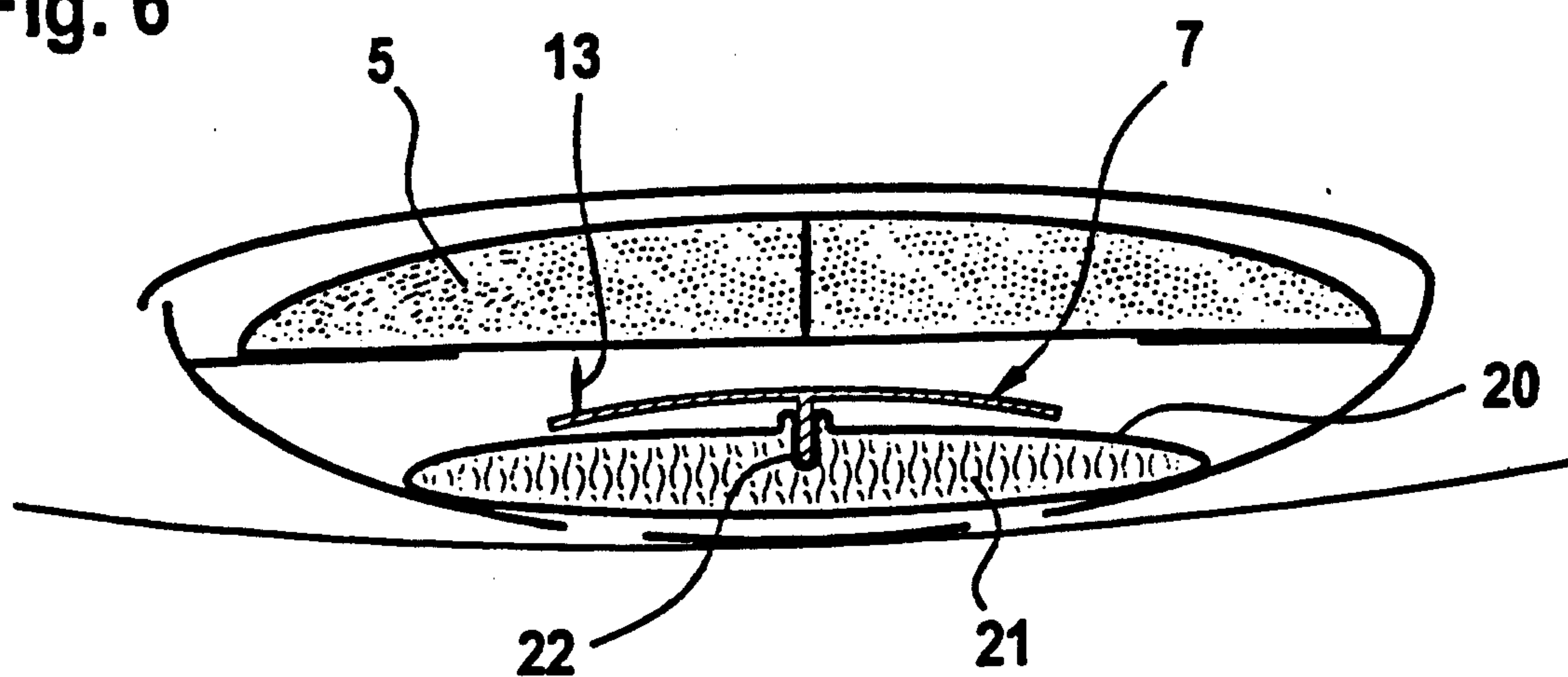


Fig. 7

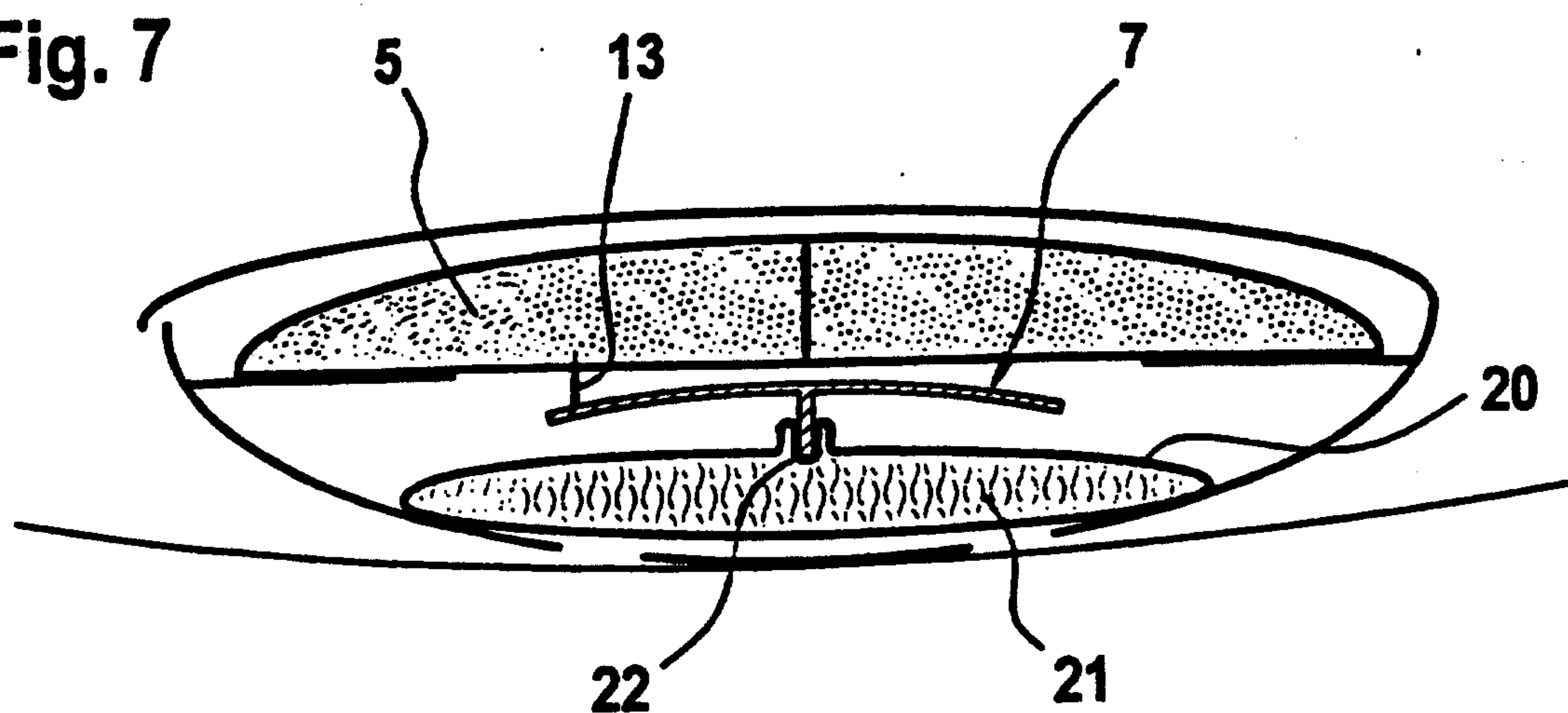


Fig. 8

