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(54) Cross flow fan

(57) The invention relates to a ventilator of the cross flow type, provided with a fan (1) in the shape of a number of cylindrically arranged blades (2), an exit surface (5) located near the blades (2) and a stabilisation surface (6) located near the blades (2), as well as drive means (7), connected to the main shaft (3). The exit surface (5) and the stabilisation surface (6) are mutually connected and mounted for rotation round an auxiliary shaft (3). This results in a ventilator of which the direction of the airflow may easily be reversed.

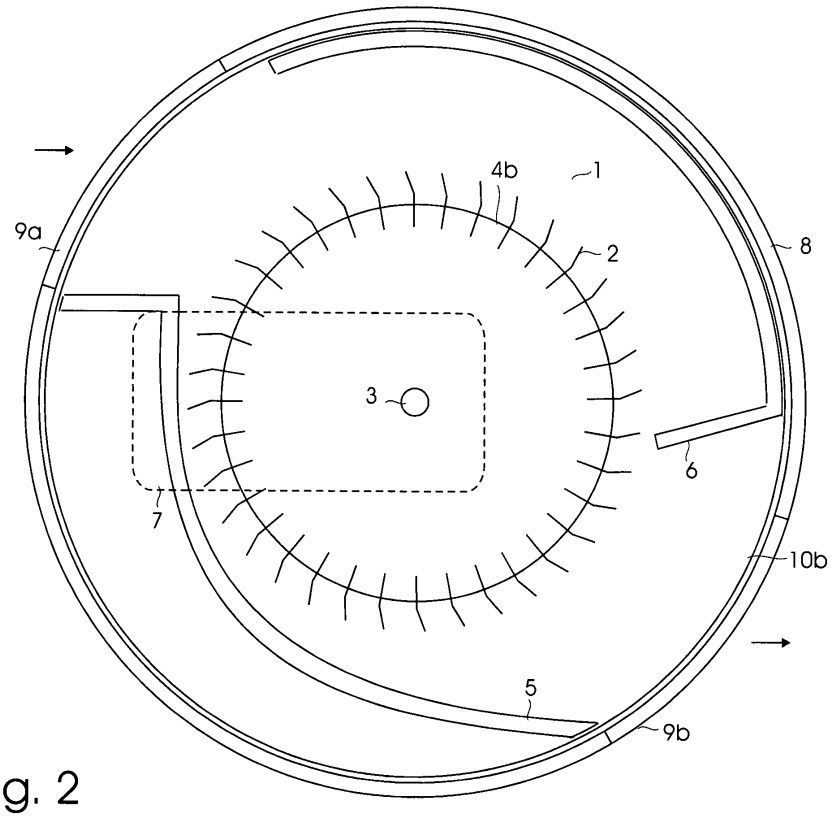

Fig. 2

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Description

[0001] The invention relates to a ventilator of the cross flow type, provided with a fan in the shape of a number of cylindrically arranged blades, mounted parallel to a central shaft and connected to this central shaft, an exit surface located near the blades and a stabilisation surface located near the blades, as well as drive means, connected to the main shaft. Ventilators of this type can be found in a multitude of applications, as they can be produced easily, occupy little room and quietly perform their jobs. A disadvantage of the known ventilator is that for a proper operation the direction of rotation of the motor is fixed, in the sense that reversing the direction of rotation will not influence a direction of the airflow but will only result in a situation in which substantially no air is moved any longer. Therefore, according to the state of the art, the direction of the airflow may only be changed by rotating the entire ventilator round its main shaft.

[0002] The invention is based on the observation that the direction of the air flowing out depends upon the position of the exit surface and in a lesser degree also upon the position of the stabilisation surface. The ventilator according to the is thereto characterised in that the exit surface and the stabilisation surface are movably disposed with respect to the fan.

[0003] A favourable embodiment of the inventive ventilator which may easily be produced is characterised in that the exit surface and the stabilisation surface are interconnected and mounted for rotation round an auxiliary axis, which means that the drive means and the fan coupled to it may remain in place.

[0004] A further favourable embodiment which enables a compact design is characterised in that the main shaft and the auxiliary axis run at least substantially parallel to each other.

[0005] A further favourable embodiment is characterised in that the ventilator is provided with a cylindrically shaped housing, provided with an elongated first ventilation opening, disposed parallel to the main shaft and an elongated second ventilation opening, disposed parallel to the main shaft and opposite to the first ventilation opening. Preferably, the exit surface and the stabilisation surface may be rotated such that an opening between the exit surface and the stabilisation surface connects to the first ventilation opening or to the second ventilation opening.

[0006] A further favourable embodiment is characterised in that the exit surface and the stabilisation surface may be rotated such that an opening between the exit surface and the stabilisation surface is positioned between the first ventilation opening and the second ventilation opening. In this way, the first ventilation opening and the second ventilation opening may be completely closed.

[0007] A further favourable embodiment is characterised in that the exit surface and the stabilisation surface may be rotated such that a first ventilation opening is closed, the exit surface connects to the second ventilation opening and the stabilisation surface is positioned at least substantially centrally in front of the second ventilation opening. It is possible then to circulate the air inside a room, without air entering the room from outside.

[0008] In order to rotate the exit surface and the stabilisation surface, one may for example use a control lever projecting out of the cylindrically shaped housing, that may be shifted back and forth in a slot. A favourable embodiment however is characterised in that the ventilator is provided with additional drive means for making the exit surface and the stabilisation surface rotate round the auxiliary axis.

[0009] A further favourable embodiment with which a cheap but also very light bidirectional ventilator may be realised is characterised in that the cylindrically shaped housing, the exit surface and the stabilisation surface are made of plastic.

[0010] The invention also relates to a ventilation strip, provided with a ventilator as described in the previous paragraphs. Such a ventilation strip may advantageously be used for ventilating rooms, by including the ventilation strip in a windowframe or in a window. One may easily choose then between sucking away air from the room, for example if one is smoking inside, or for blowing outside air into the room. Moreover, the ventilator may be placed into an in-between position, in which case the first ventilation opening and the second ventilation opening are completely closed, which means that an airflow is stopped but also that for example traffic noise cannot enter the room via the ventilator.

[0011] The invention will now be further explained with a reference to the following figures, in which:

- Fig. 1 shows a possible embodiment of a ventilator of the cross flow type according to the state of the art in cross section;
- Fig. 2 shows a possible embodiment of a ventilator of the tangential type according to the invention in cross section;
- Fig. 3A shows this embodiment in a position in which the direction of the airflow is reversed;
- Fig. 3B shows this embodiment in a position in which the input opening and the outlet opening are closed;
- Fig. 4 shows an embodiment in which the input opening is closed and in which air may be circulated inside a room;
- Fig. 5 shows a hand-operated ventilator according to the invention in front view;
- Fig. 6 shows an electrically operated ventilator according to the invention;
- Fig. 7A shows a possible embodiment of a ventilation strip provided with a ventilator according to the invention in front view;
- Fig. 7B shows this embodiment in side view.

[0012] Fig. 1 shows a possible embodiment of a ven-

tilator of the cross flow type according to the state of the art in cross section, consisting of a fan 1, constructed of elongated blades 2 which are mounted parallel to a shaft 3 and which are connected to it with the aid of end plates 4a,4b, of which in the figure only end plate 4b is visible, as well as an exit surface 5 and a stabilisation surface 6. The shapes of exit surface 5 and stabilisation surface 6 are chosen such that an airflow indicated by arrows will be generated. For driving the ventilator, an electric motor 7 is provided, mounted to the end of shaft 3. Experimentally, it may easily be verified that reversing the direction of rotation van electric motor 7 will not or practically not lead to an airflow in the reverse direction.

[0013] Fig. 2 shows a possible embodiment of a ventilator of the tangential type according to the invention in cross section, also consisting of a fan 1, constructed of elongated blades 2 which are mounted parallel to a shaft 3 and which are connected to it with the aid of end plates 4a,4b, of which in the figure only end plate 4b is visible, as well as an exit surface 5, a stabilisation surface 6 and an electric motor 7 mounted to the end of shaft 3. All components are housed in a cylindrically shaped housing 8, which is provided with two openings 9a,9b, disposed parallel to shaft 3, while exit surface 5 and stabilisation surface 6 are mounted between two end flanges 10a, 10b, of which in the figure only end flange 10b is visible. End flanges 10a,10b may rotate inside housing 8, together with exit surface 5 and stabilisation surface 6. In the position shown in this figure, opening 9a forms the inlet opening and opening 9b the outlet opening and air flows in the direction indicated by the arrows.

[0014] Fig. 3A shows this embodiment in a position in which the direction of the airflow is reversed, simply by rotating exit surface 5 and stabilisation surface 6, together with end flanges 10a,10b inside housing 8. Fig. 3B shows this embodiment in a position in which the openings 9a,9b are closed, also by rotating exit surface 5 and stabilisation surface 6, together end flanges 10a, 10b inside cylindrically shaped housing 8.

[0015] Fig. 4 shows an embodiment in which opening 9a is closed and in which air may be circulated inside a room which connects to opening 9b. For that purpose, a cylindrically shaped part of stabilisation surface 6 has been shortened, which makes it impossible to close opening 9a and opening 9b simultaneously, but which results in air being sucked in on a top side of opening 9b and air being blown out on a bottom side of opening 9b in the shown position.

[0016] Fig. 5 shows a hand-operated ventilator according to the invention in front view, with fan 1 which is visible inside cylindrically shaped housing 8 via opening 9a, constructed of elongated blades 2 which are mounted parallel to a shaft 3, as well as part of stabilisation surface 6. Exit surface 5, not visible in the figure and stabilisation surface 6 are mounted between end flanges 10a,10b, which also contain the bearings of shaft 3. Electric motor 7 is rigidly connected to cylindrically shaped housing 8. To end flange 10b, a control lever 11 is connected which may be moved inside a slot 12 in cylindrically shaped housing 8, in this way operating exit surface 5 and stabilisation surface 6.

[0017] Fig. 6 shows a ventilator according to the invention which completely corresponds to the embodiment explained with a reference to Fig. 5, but which is provided with electrically operated control means 13, obvious for the skilled person, instead of a control lever 11, for rotating end flange 10b inside cylindrically shaped housing 8.

[0018] Fig. 7A shows a possible embodiment of a ventilation strip 14 provided with a ventilator according to the invention in front view. The ventilator completely corresponds with the embodiment explained with a reference to Fig. 5. It is included in a plate-shaped part 15 which may easily be integrated in for example a window. Plate-shaped part 15 and for example half of the cylindrically shaped housing 8 may be produced in one part, which results in a robust construction which can easily be produced and assembled.

[0019] Fig. 7B shows this embodiment in side view, with cylindrically shaped housing 8, plate-shaped part 15 and control lever 11. Obviously, ventilation strip 14 may be provided with electrically operated control means, as explained with a reference to Fig. 6.

Claims

1. Ventilator of the cross flow type, provided with a fan in the shape of a number of cylindrically arranged blades, mounted parallel to a central shaft and connected to this central shaft, an exit surface located near the blades and a stabilisation surface located near the blades, as well as drive means, connected to the main shaft, **characterised in that** the exit surface and the stabilisation surface are movably disposed with respect to the fan.

2. Ventilator according to claim 1, **characterised in that** the exit surface and the stabilisation surface are interconnected and mounted for rotation round an auxiliary axis.

3. Ventilator according to claim 2, **characterised in that** the main shaft and the auxiliary axis run at least substantially parallel to each other.

4. Ventilator according to claim 3, **characterised in that** the ventilator is provided with a cylindrically shaped housing, provided with an elongated first ventilation opening, disposed parallel to the main shaft and an elongated second ventilation opening, disposed parallel to the main shaft and opposite to the first ventilation opening.

5. Ventilator according to claim 4, **characterised in that** the exit surface and the stabilisation surface may be rotated such that an opening between the

exit surface and the stabilisation surface connects to the first ventilation opening or to the second ventilation opening.

6. Ventilator according to claim 5, **characterised in that** the exit surface and the stabilisation surface may be rotated such that an opening between the exit surface and the stabilisation surface is positioned between the first ventilation opening and the second ventilation opening.

7. Ventilator according to claim 5, **characterised in that** the exit surface and the stabilisation surface may be rotated such that a first ventilation opening is closed, the exit surface connects to the second ventilation opening and the stabilisation surface is positioned at least substantially centrally in front of the second ventilation opening.

8. Ventilator according to one of the previous claims, **characterised in that** the ventilator is provided with additional drive means for making the exit surface and the stabilisation surface rotate round the auxiliary axis.

9. Ventilator according to one of the claims 4 to 8, **characterised in that** the cylindrically shaped housing, the exit surface and the stabilisation surface are made of plastic.

10. Ventilation strip, provided with a ventilator according to one of the claims 4 to 9.

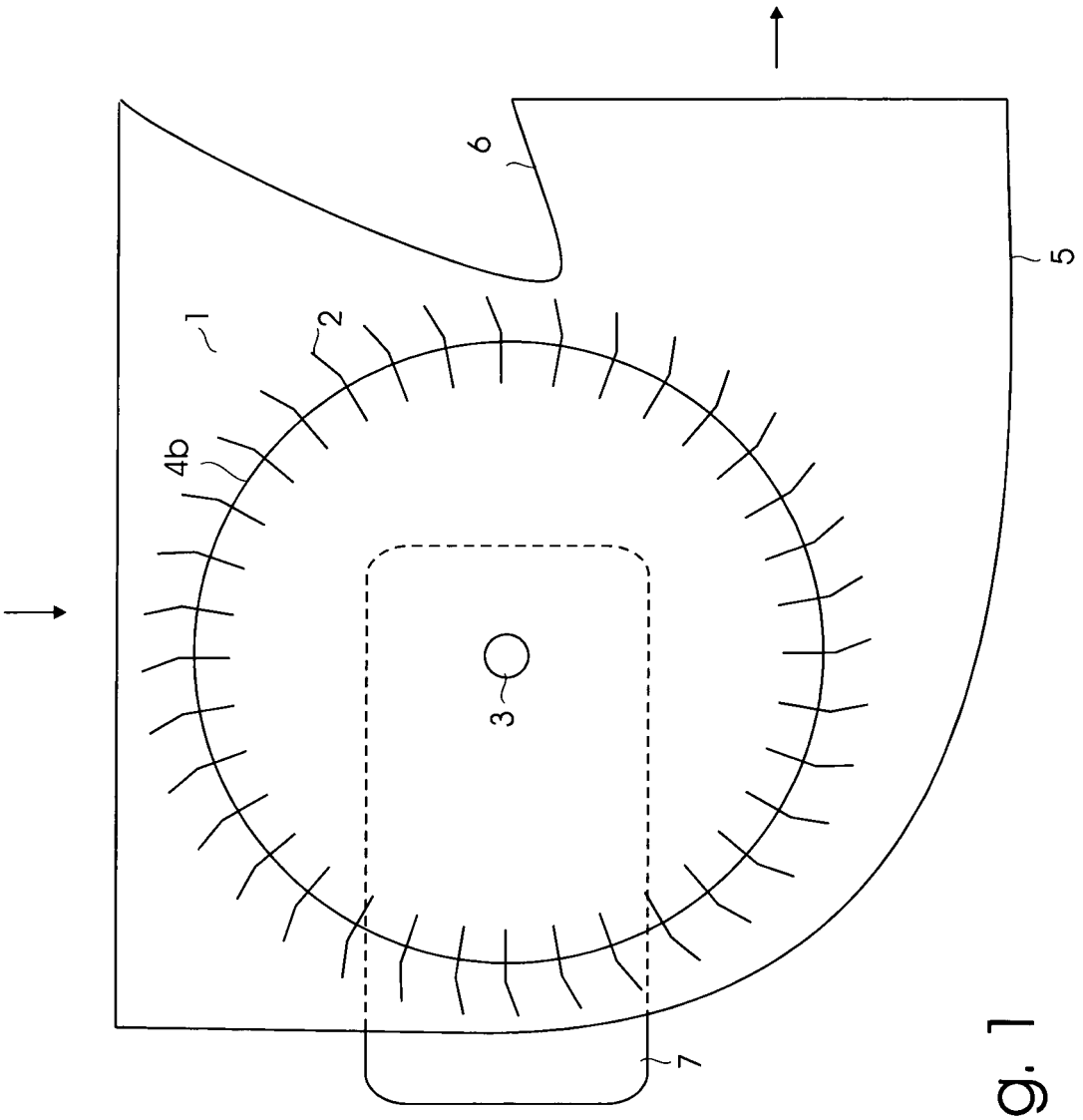

Fig. 1

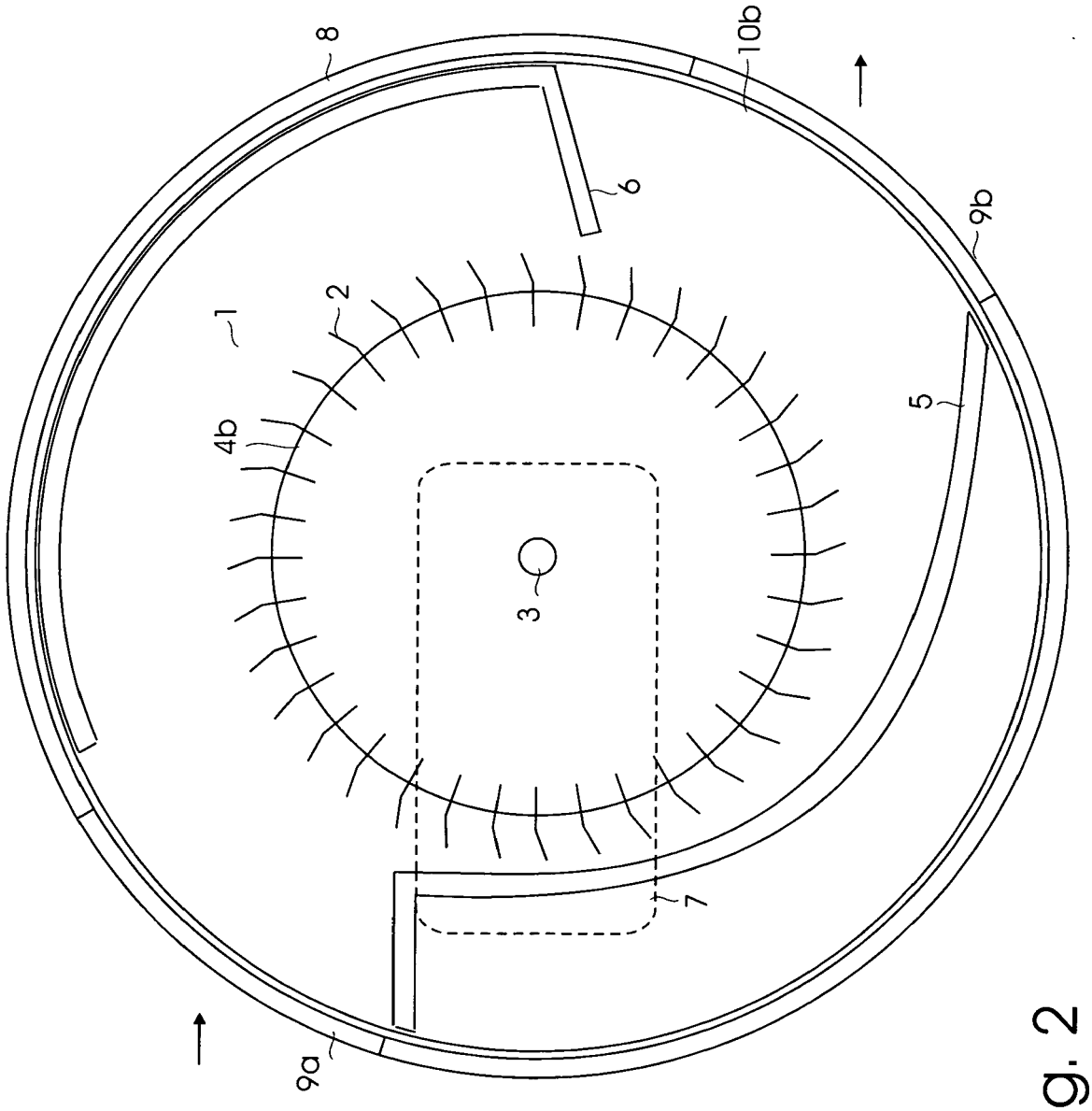

Fig. 2

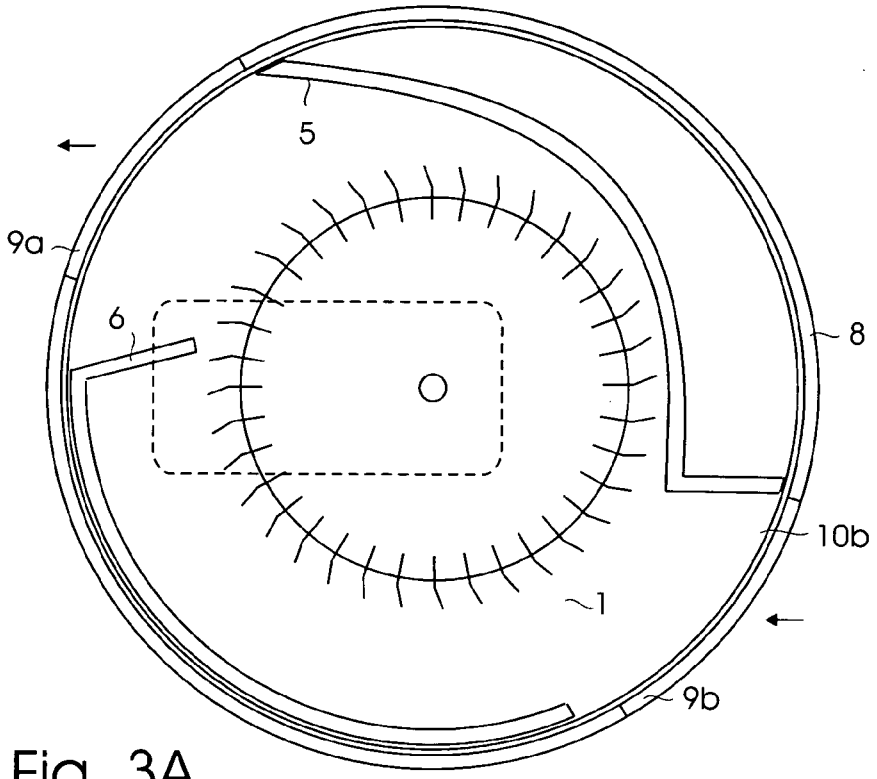

Fig. 3A

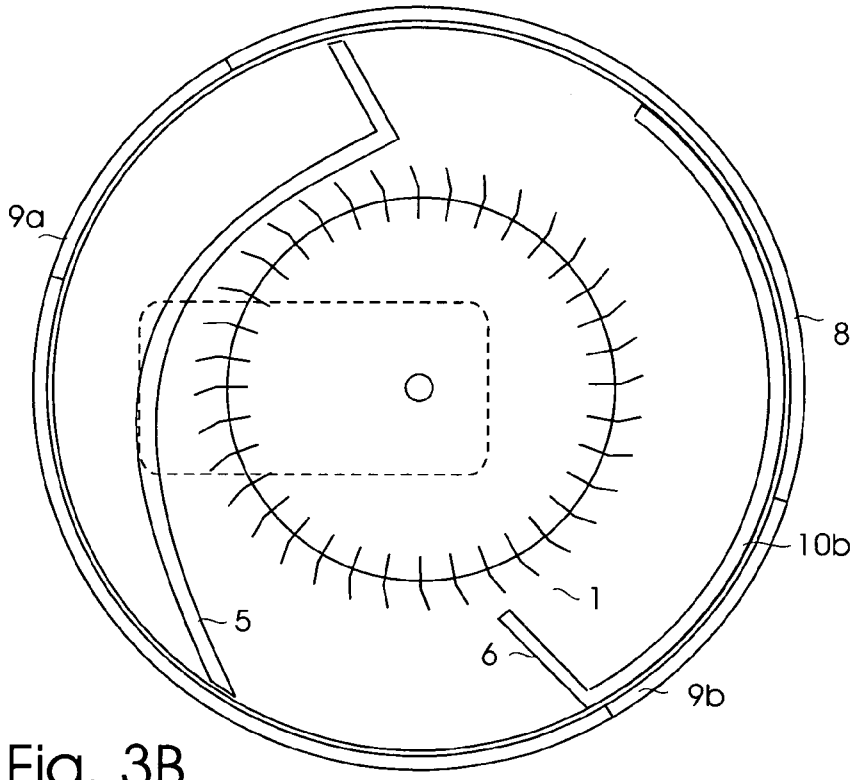

Fig. 3B

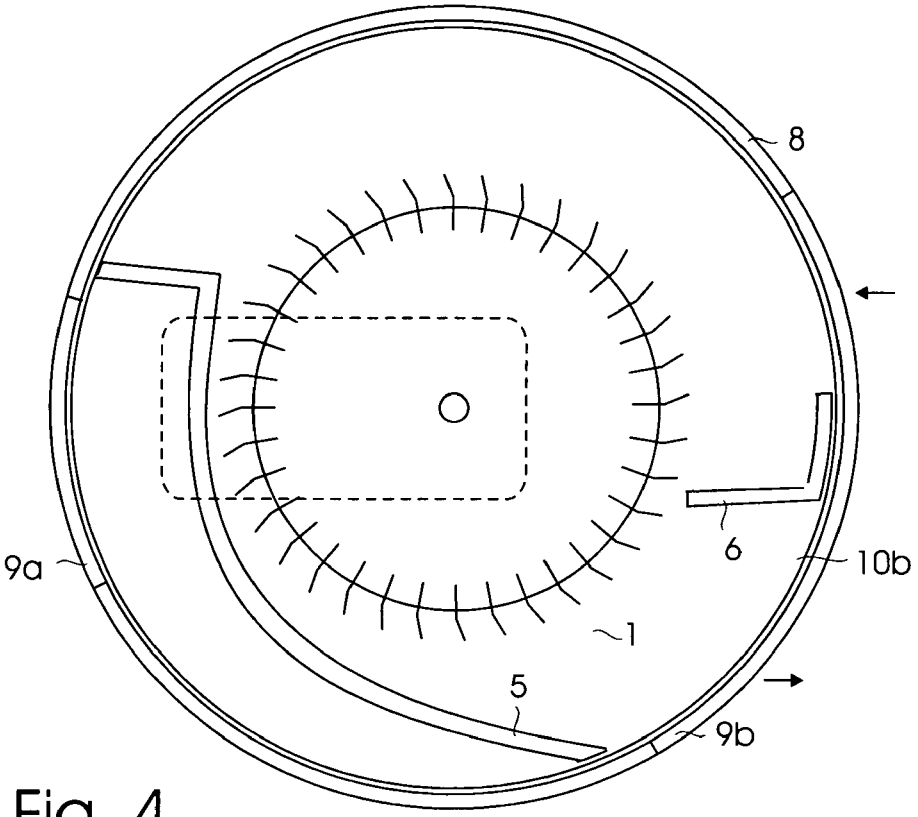

Fig. 4

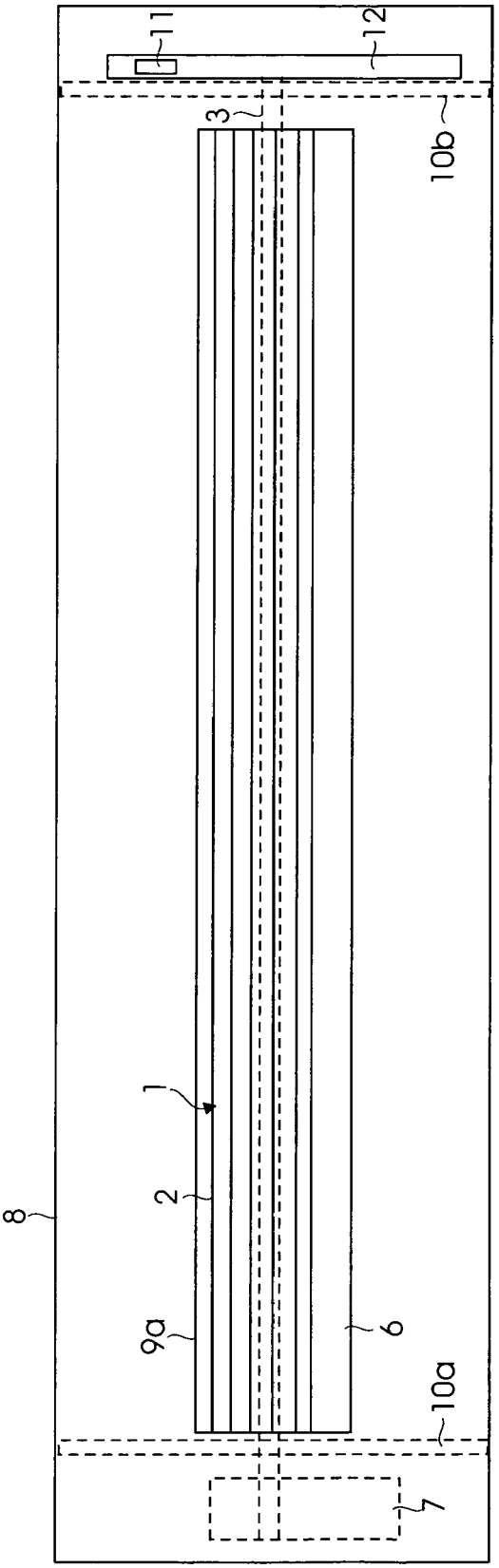

Fig. 5

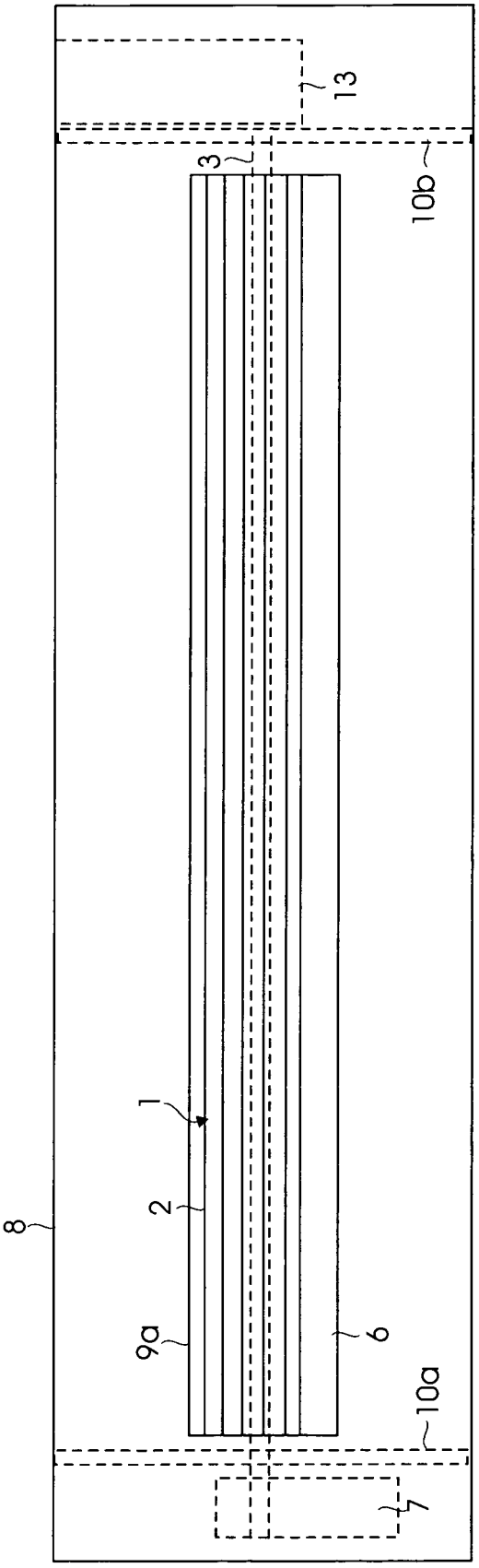

Fig. 6

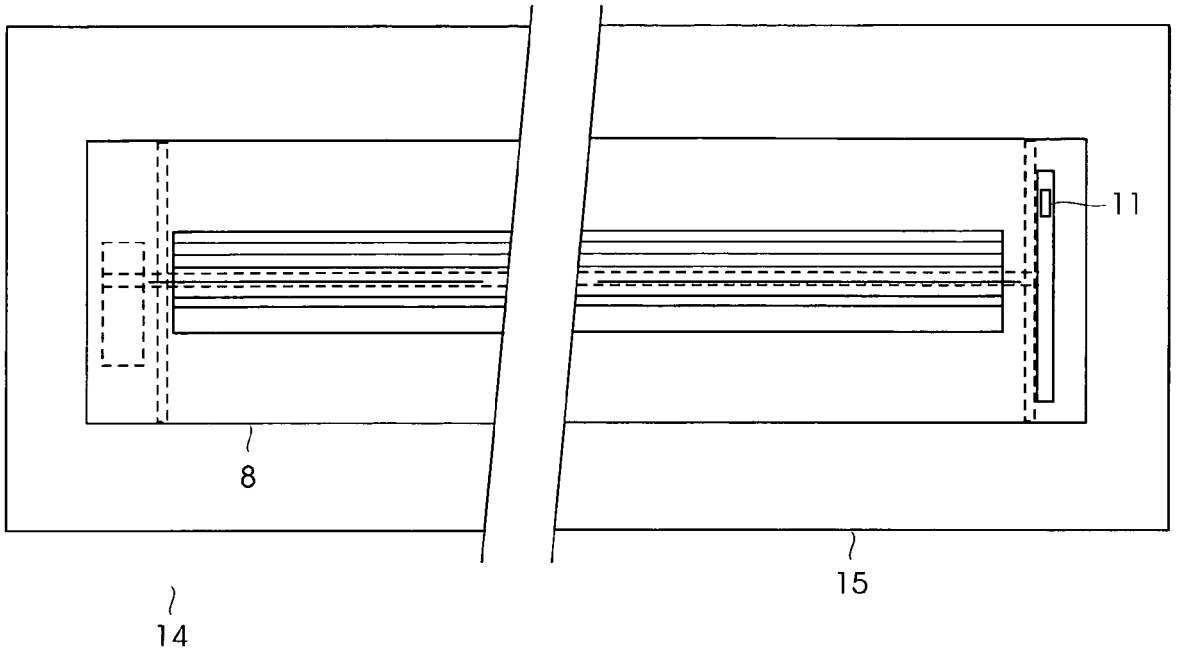

Fig. 7A

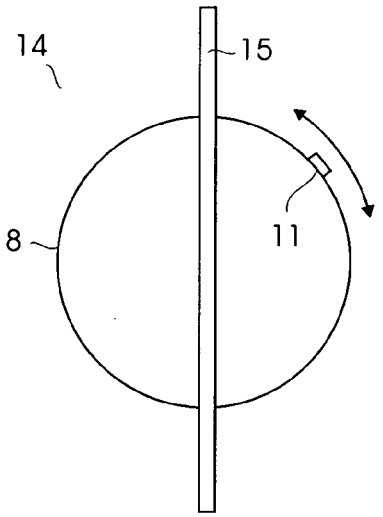

Fig. 7B