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(54) **A DEVICE LEADING IN VENTILATION AIR**

VENTILATIONSFLUFTEINLASS

DISPOSITIF D'ENTREE D'AIR DE COMPENSATION DE VENTILATION

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Description

[0001] The intake of ventilation compensation air is an air distributor for use in the space between a heating radiator and outer wall.

[0002] The box of the device fitted with an air filter and a damper and attached to the outdoor air duct makes by means of air ports the outdoor air turn towards and intermingle with indoor air before it enters the occupied area and produces required additional heating together with the heating radiator. As technical level the US-A-5 257 738 is presented describing the intake of compensation air to a box behind the heating radiator and further to the room space.

[0003] This invention relates to a device particularly applicable to places, where the ventilation of a room space is based on negative pressure produced by a discharge fan, which causes flow of compensation air into indoor spaces. The device can also be used as a compensation air device of other exhaust ventilation, e.g. in fireplaces, and s.c. ventilation of its own.

[0004] The objective of this invention is also to produce a device, by means of which the disadvantages of air intake by ordinary arrangements are avoided, such as draught, dust and outdoor-noise problems. Due to said adverse factors, generally the air intake is shut by the user in one way or another, and thus the ventilation cannot work as intended.

[0005] The objective of this invention is to create such an intake device of compensation air that it can be used in combination with different type heating radiators and also to improve the intake of air in old quarters needing renovation, so that by means of this device air can be filtered and heated at the same time the device is also muffling possible outdoor noise. In a typical case, the box of the device is placed behind a radiator in the room or a radiator to be installed there and heated either by electricity or water. The heating radiator warms up the cover of the box construction and dries off moisture possibly condensing on the surface of the box, prevents icing and evaporates moisture formed by snow or rain water and possibly entering the box with outdoor air. By means of air ports, the box of the device divides the outdoor air purposefully into three parts and steers it out of the box. By the effect of negative pressure, the air ports also steer the outdoor air evenly over the entire filter surface.

[0006] If necessary, the user can, by means of the damper system in the device, control and steer the amount of air entering the room, for instance lessen it in order to reduce ventilation, to prevent the feeling of draught or even to diminish additional air flow due to wind. Closing the other half of the two-piece damper steers the air flow to the opposite side of the device box and in this way it is also possible to influence the direction of air flow in the room.

[0007] Replacement of filter has in this device is done easily without turning the battery aside, one only has to

lift the filter cassette out from the slot in the device. As filter an efficient filter mat with a sufficient cross-section and moderately priced can be used, one only has to put it in the cassette and press through the slot into place. Essential for the device is that its loss of pressure with the wanted quantity of air remains low enough.

[0008] Tilting the filter as per the invention makes it possible to diminish the resistance of flow. The inclined filter position also enables cleansing of the device box, i.e. vacuum-cleaning with a narrow nozzle through the filter access hole thoroughly along the bottom portions of the box. In this manner the intake can be made as narrow as possible and thus well applicable for instance behind an old radiator, or the radiator can be moved a little farther from its ordinary position off the wall by means of adjustable brackets.

[0009] The invention is characterized in what is presented in the enclosed patent claims. In the following the invention is disclosed with reference the attached drawings, where

Fig. 1 is the device in contact with a radiator and viewed from the back of the radiator.

Fig. 2 is a cross-section of the device from the front side.

Fig. 3 is a cross-section of the device from line 3-3.

Fig. 4 is the air filter support cassette from the front side and its cross section.

[0010] The device is attached by means of connector 1 to outdoor air duct 19. The compensation air device is comprised of a device box 2, which is through separation by filter portion 3 divided into two chambers, the first one is the chamber of not-filtered air, and the second one the chamber of filtered air. Filter portion 3 is in inclined position, which enables vacuum-cleaning of the device box bottom with a narrow nozzle and facilitates assembly of the filter into and out of its place, especially also in a case, where the window sill is a protruding construction.

[0011] On aiming at a small resistance of flow, the opening of connector 1 is placed in the upper part of the device box, where the air inlet flow gets as far as possible from the impact surface, that is from the filter 3 arranged in inclined position. Filter 3 that is to be placed in support cassette 4 is pressed into place through a uniform opening 11 as broad as the device, arranged in the upper part of the box.

[0012] Installation of filter 3 is done by means of an assembly lever 5 of same length as the filter of support cassette 4. Lever 5 supports the cassette construction and functions also as a sealing coverplate of fitting hole 11. Filter 3 takes its accurate position steered by guide bars 6, which are fastened to the end faces of the device box and propped against the cover plate on the outer wall side. For control and steering of the amount of air, in front of the outdoor air opening there is a two-piece damper 7, with articulation 9 in its lower portion and operated with control handles 8. The control handles are moved in slots 10 functioning simultaneously as support for the damper upper end position.

[0013] In the device box ends there are air ports 12 in the second chamber portion, i.e. in the filtered-air part of the box. Further, the side face of the box on the radiator side is furnished with a hole 13 steering the flow upwards and most suitably arranged in the lower part of the box so that air can flow a longer distance upward in contact with the radiator back wall. From the same intermediate space room air 17 flows upward and in this space compensation air becomes efficiently mixed with room air and heat efficiently transmitted to the mixed air flow from the radiator back face.

[0014] In the box lower portion a bottom basin 14 is formed into which moisture possibly entering with outdoor air accumulates, e.g. rain water or melted water from snow taken in. Water gets into the basin through water holes 6.1 made in guide bar 6, from where it either evaporates in the air or, if required by local circumstances, the basin can be drained with a plastic hose 16 connected to the device. By means of air ports 12,13 outdoor air is steered towards the outer wall and into recirculated air 17. Outdoor air is brought to the governor box along the outdoor air duct 19 that is connected to an ordinary outdoor grid 20 in the outer wall 21 exterior surface.

[0015] The narrow box construction of the device and the filter sheet inside in form a construction efficiently muffling outdoor noise. If necessary, the outdoor air duct 19 can also be furnished a separate muffling inner tube (not illustrated) with a small flow resistance.

[0016] Filter 3 of the device is of ordinary filter mat material placed in a flexible support cassette 4 as per figure 4. The horizontal support ribs 4.1 of the supporting lattices keep the filter mat straight and the outermost lateral support ribs 4.2 guide the supporting mat in slot 11 so that horizontal ribs 4.1 and filter 3 do not get stuck in slot 11 or in guiding ribs 4.

[0017] By means of the construction it is possible get the filter accurately guided and by means of the filter material the open ends to take their places self-sealingly. The filter is lifted out from the device box and installed into it by means of uniform lever 5. When the filter is assembled or removed from the cassette the support ribs 4.1 and 4.2 of the supporting cassette are slightly opened/shut since they are of flexible construction.

Claims

1. An intake device of ventilation compensation for use as an air distributor in the space formed between the heating radiator (18) and outer wall (21), the device comprising a box (2), a connector part (1) fixed in the box for connection to air filter (3), a damper (7) and air flow ports (12,13) for conveying compensation air into room air mixed to said room air before said conveying, **characterized in that** the device comprises
a first chamber as broad as box (2), into which

air comes from the outside, further

a second chamber as broad as the box (2), being provided with lateral side ports (12) und a lower edge port (13) out of which compensation air flows both from the chamber opposite sides to the side and from the chamber lower edge upward parallel with radiator (18) surface wherein the intermingling of room air and compensation air takes place outside the box (2) in the space between said box and said radiator and between said wall and radiator, and

a chambers-separating filter (3) between the chambers as broad as box (2) and whose upper edge is inclined towards the radiator (18).

2. A device according to patent claim 1 **characterized in that** for distribution of air flow evenly through filter (3) the air flow ports (12),(13) starting from the second chamber are placed on several side portions of the box.
3. A device according to patent claim 1 **characterized in that** the upper side of the box comprises a fitting hole (11) through which the filter (3) can be lifted out from the box and through which the bottom portion of the box (2) can be cleaned.
4. A device according to any of the above patent claims 1-3 **characterized in that** filter cassette (4) of filter (3) has an assembly lever (5) functioning simultaneously as an element closing and sealing the fitting hole (11).
5. A device according to any of the previous claims 1-4 **characterized in that** the device has a pair of dampers (6) controlling the flow and steering the direction of flow, each damper being able to turn with an articulation (9) in their lower portion and they can be moved and supported by control handles (8) protruding from a slot (10) in the device box.
6. A device according to any of the previous claims 1-5 **characterized in that** the box (2) comprises a moisture collecting means as a bottom basin (14) into which condensed water is lead via holes (6.1) from the first chamber, wherein by means of the heating radiator (18) moisture is evaporated from said basin.
7. A device according to claim 6 **characterized in that** the bottom basin (14) has a connection for draining of water from the basin, for instance along pipeline (15).
8. A device according to any of the previous claims 1-7 **characterized in that** the horizontal support ribs (4.1) of the flexible filter support cassette (4) keep the filter straight and the outmost lateral support ribs

(4.2) guide filter (3) into its place by means of hole (11) edges and guide bars (6).

9. A device according to any of the previous claims 1-8 **characterized in that** narrow box construction and filter sheet inside it form a outdoor noise muffling construction.

Patentansprüche

1. Eine Einlassvorrichtung für Kompensationsluft der Ventilation zur Verwendung als Luftverteiler im Raum gebildet zwischen Heizkörper (18) und Außenwand (21), die Vorrichtung bestehend aus einem Kasten (2), einem an den Kasten angebrachten Anschlusssteil (1) zur Kupplung an Luftfilter (3), einer Klappe (7) und Durchflussöffnungen (12,13) zum Leiten von Kompensationsluft in die Raumluft, gemischt in erwärmter Raumluft bevor genanntes Leiten, **gekennzeichnet dadurch, dass** die Vorrichtung enthält:

Eine erste Kammer so breit wie der Kasten (2), in den Luft von Aussen kommt, dazu eine zweite Kammer so breit wie der Kasten (2), versehen mit lateralen Seitenöffnungen (12) und eine Öffnung (13) in der unteren Kante, durch welchen die Kompensationsluft von den gegensätzlichen Seiten auf eine Seite herausfließt und von der unteren Kante der Kammer aufwärts parallel mit der Fläche des Heizkörpers (18), wo die Kompensationsluft und Raumluft außerhalb des Kastens (2) in dem Raum zwischen dem erwähnten Kasten und dem erwähnten Heizkörper, und zwischen der erwähnten Wand und dem Heizkörper gemischt werden, und einen, die Kammer separierenden Filter (3) zwischen den Kammern und breit wie der Kasten (2), und mit seiner oberen Kante gegen den Heizkörper (18) geneigt.

2. Eine Vorrichtung gemäß Patentanspruch 1 **gekennzeichnet dadurch, dass**, zur gleichmäßigen Verteilung der Luftströmung durch Filter (3), die Durchflussöffnungen (12),(13) ab zweiten Kammer auf mehreren verschiedenen Stellen auf Seiten des Kastens angeordnet sind.

3. Eine Vorrichtung gemäß Patentanspruch 1 **gekennzeichnet dadurch, dass** der obere Teil des Kastens eine Einbauöffnung (11) hat, durch die der Filter (3) aus dem Kasten ausgehoben, und durch die der Bodenteil des Kastens (2) gereinigt werden kann.

4. Eine Vorrichtung gemäß einem der obigen Patentansprüche 1-3 **gekennzeichnet dadurch, dass**

die Filterkassette (4) des Filters (3) eine Einbaueinheit (5) hat, die gleichzeitig als Gerät zum Schließen und Dichten der Einbauöffnung (11) funktioniert.

5. Eine Vorrichtung gemäß einem der obigen Patentansprüche 1-4 **gekennzeichnet dadurch, dass** die Vorrichtung ein Paar Klappen (6) zur Regulierung der Strömung und Lenkung der Strömungsrichtung hat, wobei jede Klappe mit Gelenkverbindung (9) in ihrem unteren Teil drehbar ist, und dass sie mit Regelstangen (8), die von Schlitz (10) im Kasten der Vorrichtung hervorstechen, bewegt und gestützt werden können.

6. Eine Vorrichtung gemäß einem der obigen Patentansprüche 1-5 **gekennzeichnet dadurch, dass** der Kasten (2) feuchtsammelnde Mittel, wie einen Bodenbecken (14) hat, in den Kondenswasser durch Öffnungen (6.1) aus der ersten Kammer geleitet wird, wo mit Hilfe des Heizkörpers (18) Feucht aus dem erwähnten Becken verdunstet wird.

7. Eine Vorrichtung gemäß Patentanspruch 6 **gekennzeichnet dadurch, dass** der Becken (14) mit Anschluss für Wasserablass aus dem Becken versehen ist, zum Beispiel über Rohrleitung 15.

8. Eine Vorrichtung gemäß einem der obigen Patentansprüche 1-7 **gekennzeichnet dadurch, dass** horizontale Stützrippen (4. 1) der Stützkassette (4) des biegsamen Filters den Filter aufrecht halten und die Äußersten lateralen Stützrippen (4.1) den Filter (3) zu seinem Platz mit Hilfe der Kanten der Öffnungen (11) und mit Gleitschienen (6) steuern.

9. Eine Vorrichtung gemäß einem der obigen Patentansprüche 1-8 **gekennzeichnet dadurch, dass** die schmale Kastenstruktur mit eingepaßter Filterscheibe einen Dämpferkonstruktion gegen Geräusch vom Außen bildet.

Revendications

1. Un moyen d'admission d'air de compensation de la ventilation, destiné à être utilisé comme un distributeur d'air placé entre le radiateur de chauffage (18) et le mur extérieur (21), l'appareil comprenant une boîte (2), une pièce d'assemblage (1) attachée à la boîte pour permettre la connexion vers un filtre d'air (3), un clapet (7) et des orifices de débit d'air (12, 13) pour conduire l'air de compensation vers l'air ambiant, celui-ci ayant été mélangé à celui-ci avant de l'y conduire, **caractérisé en ce que** l'appareil comprend une première chambre aussi large que la boîte (2), dans laquelle l'air extérieur entre, et

une seconde chambre aussi large que la boîte (2), étant munie d'orifices latéraux (12) et d'un orifice (13) sur le bord inférieur, de laquelle chambre l'air de compensation sort aussi bien latéralement par les côtés opposés que verticalement et parallèlement au radiateur (18) par l'orifice situé sur le bord inférieur, où le mélange de l'air ambiant et de l'air de compensation a lieu à l'extérieur de la boîte (2), dans l'espace entre ladite boîte et ledit radiateur, ainsi qu'entre le mur et le radiateur, et un filtre (3) qui sépare les chambres et qui est situé entre les chambres et qui est aussi large que la boîte (2) et dont le bord supérieur s'incline vers le radiateur (18).

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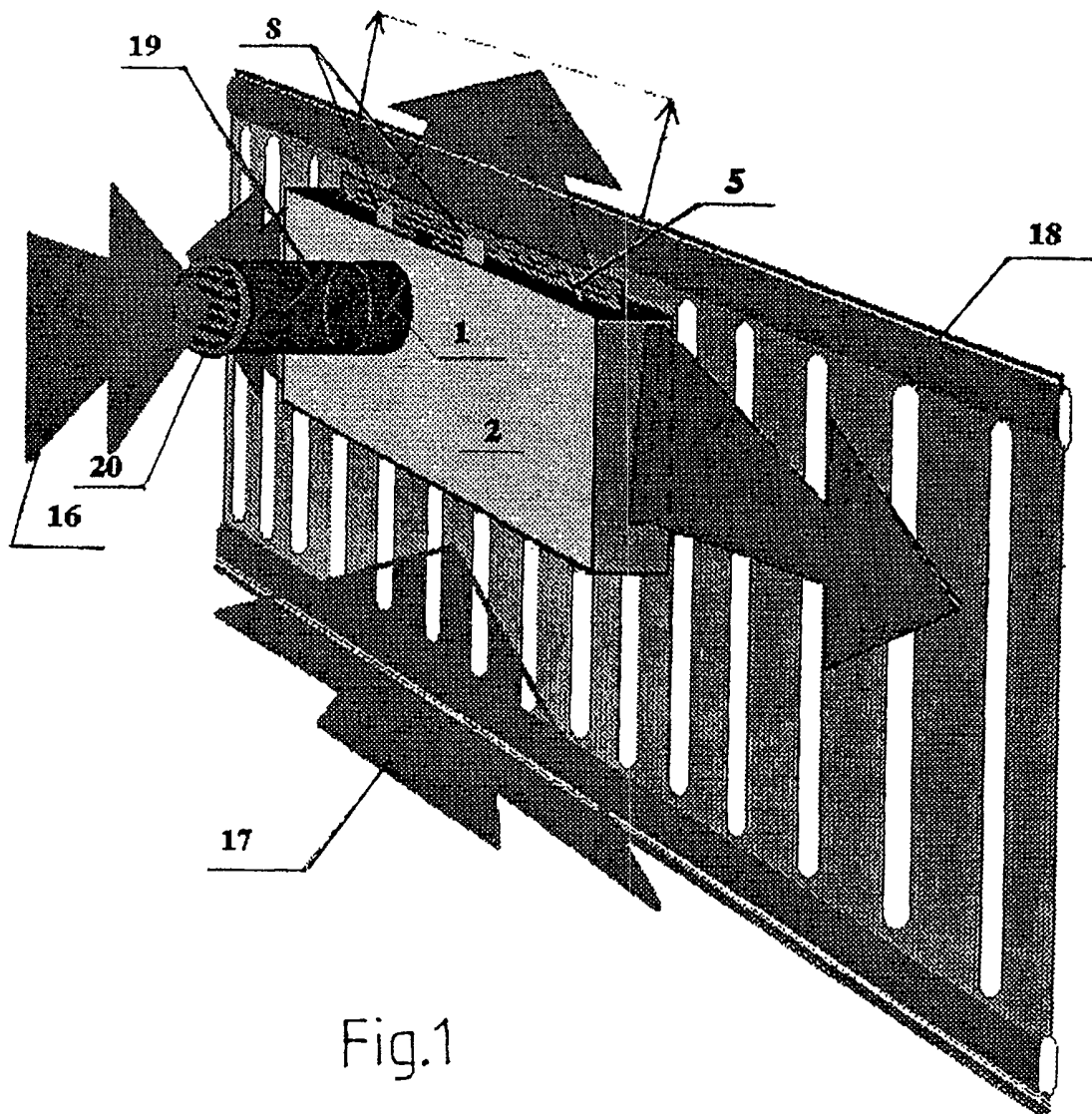
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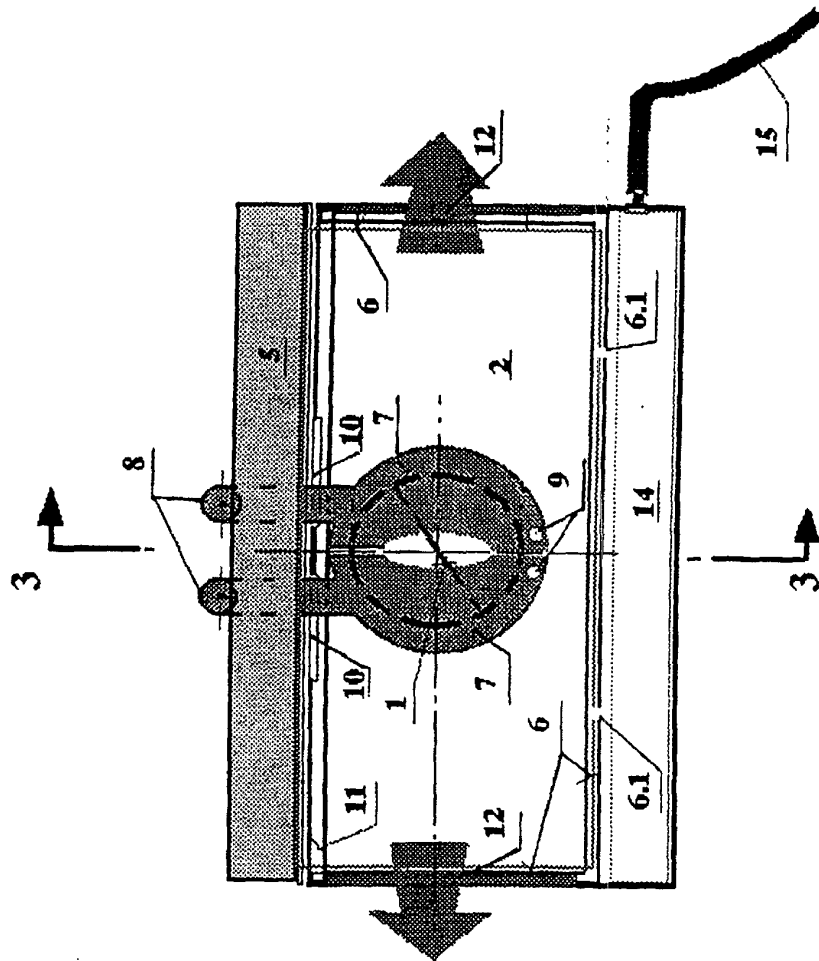
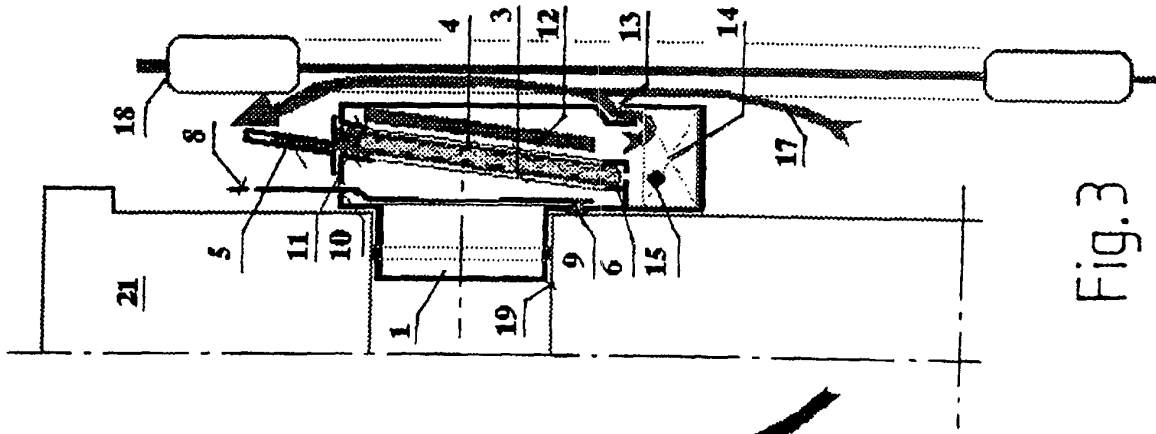
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2. Un moyen selon la revendication 1, **caractérisé en ce que** la distribution régulière de l'air à travers du filtre (3) est assurée par le placement sur plusieurs sections latérales de la boîte des orifices de circulation (12) (13) à partir de la seconde chambre. 20
3. Un moyen selon la revendication 1, **caractérisé en ce que** le côté supérieur de la boîte présente un trou d'assemblage (11) par lequel le filtre (3) peut être sorti de la boîte et par lequel il est possible de nettoyer le fond de la boîte (2). 25
4. Un moyen selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** la cartouche (4) du filtre (3) est munie d'un levier d'assemblage (5) qui fonctionne en même temps comme un élément de fermeture et un élément d'étanchéité du trou d'assemblage (11). 30
5. Un moyen selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** ce moyen est muni d'une paire de clapets (6) pour contrôler le débit et en orienter la direction, la partie inférieure de chaque clapet étant capable de tourner grâce à une articulation (9), et chaque clapet pouvant être déplacé et étant soutenu par des poignées de commande (8) faisant saillie d'une fente (10) au niveau de la boîte. 35
40
6. Un moyen selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** la boîte (2) comprend un bassin de fond (14) dans lequel l'eau de condensation est dirigée via les trous (6.1) depuis la première chambre dans le but de collecter l'humidité que le radiateur (18) fera évaporer. 45
50
7. Un moyen selon la revendication 6, **caractérisé en ce que** le bassin de fond (14) est muni d'un raccordement pour en évacuer l'eau le long d'une pipeline (15) par exemple. 55
8. Un moyen selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** les nervures ho-

rizontales internes (4.1) de la cartouche flexible (4) du filtre maintiennent le filtre droit et les nervures latérales externes (4.2) guident le filtre (3) au moyen des bords du trou (11) et des barres de guidage (6) de manière à permettre sa mise en place.

9. Un moyen selon l'une quelconque des revendications 1 à 8, **caractérisé en ce que** la construction étroite de la boîte et la plaque de filtre placée à l'intérieur d'elle constituent une construction qui amortit les bruits externes.





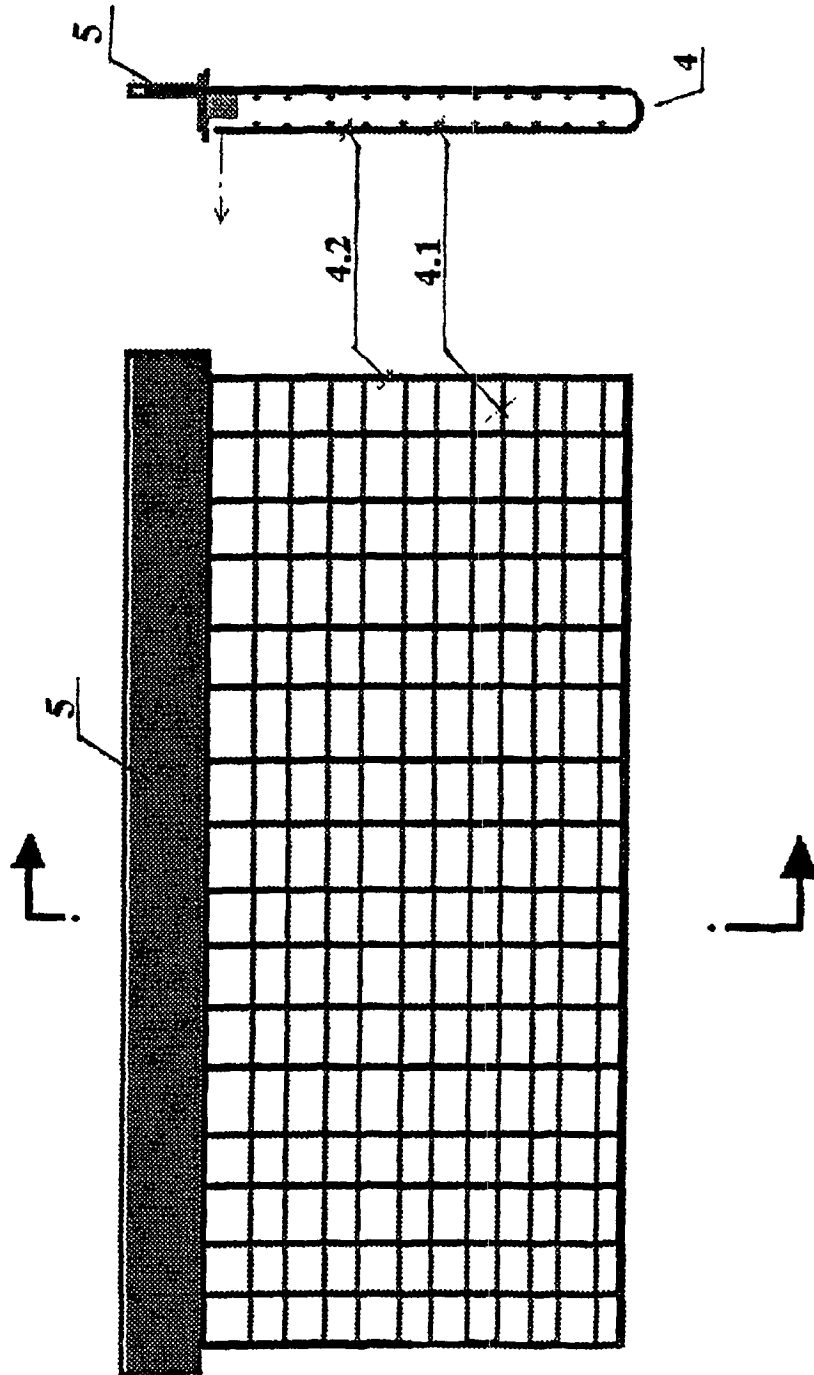


Fig.4