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Description

The present invention refers to a radiating and convection unit preferably intended to be arranged below a ceiling and of the kind comprising an elongated ventilation duct, to both sides of which at least one battery housing is connected, said battery housing is open upwardly and downwardly and is provided with a convection battery.

Background of the invention

A radiating- and convection unit of this kind is previously known through EP-B-0201473 and is used either for heating or cooling of premises or for air conditioning.

A disadvantage of these known radiating- and convection units is that they are relatively expensive to manufacture and another disadvantage is that they may not easily be adapted to present needs, e.g. by variation of the width of the ventilation duct.

Due to their construction they usually have to be delivered completely or partly in mounted condition which makes them bulky to transport and sensitive to transport damages.

The object and most important features of the invention

The object of the invention is at first hand to provide a radiating- and convection unit, which is not impaired by these disadvantages and which consists of simple, less bulky parts, which in a simple way can be connected to each other in situ and maintaining a good heat-conducting contact between the parts of the element. These objects have been solved by the fact that said radiating and convection unit is composed by separate parts, a bottom plate, which is common for the ventilation duct and the battery housing and which plate has a longitudinal rim, a partition wall common for the duct and the respective battery housing and which with a bent portion is intended to engage said rim, outlet holes being arranged in said partition wall for ventilation air from said ventilation duct, a top plate provided with side flanges and connectable with the upper end portion of the partition walls and an outer wall laterally defining each battery housing, said outer wall being fixed to the partition wall by means of a number of upper and lower binding clamps while simultaneously clamping the convection battery between said walls.

Description of the drawings

In the drawings there are shown an embodiment of the invention and some modifications thereof.

Fig. 1 is a cross-section through the radiating- and convection unit according to the present

invention.

Fig. 2 is a part section through a somewhat modified embodiment.

Fig. 3 is a part section through a further somewhat modified embodiment.

Fig. 4 is a partial front view of the radiating and convection unit, while

Fig. 5 is a partial view from above of the unit.

Fig. 6 finally shows an exploded view of the parts contained in the radiating- and convection unit according to fig. 1.

Description of embodiments

In its general construction the radiating- and convection unit comprises a ventilation duct denoted with the numeral 1 and which is built together with one or more upwardly and downwardly open battery housings denoted 2a, 2b and which each are provided with convection batteries 30, 31. The ventilation duct and the battery housings are arranged in a way so that an air stream passing through the ventilation duct by means of ejector effect provides an air stream downwardly through the element housings.

In the embodiment shown in the drawing this takes place by the fact that the air stream axially through the ventilation duct 1 is throttled and that openings 3 are arranged in the side walls of the ventilation duct and by the fact that the battery housings have their lower end surface located somewhat above these openings and that the valve housing has a bottom plate 4 which laterally projects outside the ventilation duct. In the embodiment shown the bottom plate of the ventilation duct 1 consists of a plate 4, which at its ends is bent to form two rims 5a, 5b. The side walls of the ventilation duct consists of plates 6, which each has a vertical portion 7, which downwards passes into a horizontal portion 8, which is terminated by an upwards directed portion 9. The vertical portion 7 passes upwards into a horizontal portion 10 extending in the opposite direction to the horizontal portion 8 and which is terminated by an downwards directed portion 11 (see also fig. 6). At the upper portion of the sidewall a profiled plate 12 is attached for example through pointwelding and which has a vertical portion 13, which passes downwards into a horizontal portion 14 and upwards into an upper horizontal portion 15, which passes into an oblique portion 16.

The upper side 17 of the ventilation duct consists of a plate 18, which has its free ends perpendicularly bent to form flanges 19a, 19b, which for example through point welding are attached to the side walls 7 with the upper portions of the flanges contacting the upper portions 10 of the side walls 6. By that a passage is formed between the upper portion of the ventilation duct 1 and the upper portion of the element, which passage can receive electric cables and alike.

The ventilation duct further has end fittings 20,

one of which has a number of outlet openings 21 while the other has a connection piece 22 (see fig. 4) through which air from a fan (not shown) is forced through the ventilation duct. The throttling of the air stream through the ventilation duct mentioned above is of course determined to its size by the number of openings 21 and their dimensions.

The battery housings 2a, 2b have an inner side wall which is common with the respective outer wall of the respective ventilation duct and an outer side wall 23, which has the shape of a profile, preferably an extruded aluminium profile. This has a vertical portion 24, which passes downwardly into a substantially horizontal portion 25, which is terminated by a male portion 26 in the form of a notch. Between the ends of the vertical portions 24 it forms a projecting web 27 and upwards it forms a horizontal portion 28, which passes into an oblique portion 29. The distance between the portion 28 and the portion forming the web 27 corresponds to the distance between the upper and lower horizontal portions 14, 15 of the profile plate 12 and substantially corresponds to the height of the convection element 30. These consist of plane plates which have holes for guiding a pipe 31 for example a cooling medium. The plates can have pressed stiffening webs 32 and have two opposite edges portions perpendicularly bent to form flanges 33a, 33b. The convection elements are placed close to each other at which the height of the flange 33a, 33b will be determined by the distance therebetween.

In order to fix these outer side walls to the side walls of the ventilation duct and at the same time fix the convection element and to provide a good heat conduction between the different element portions a first binding clip 34 preferably consisting of plate strips 35, which are obliquely bent at their free ends to form oblique flanges 36a, 36b intended to engage the oblique portions 29 and 16 (see fig. 1) and a second binding clip 37 obtained by cutting an extruded profile 37, which is substantially L-shaped with a rib portion 38 provided with a raised portion 39 in which a number of attachment holes 40 are located. The rib portion 38 has an extended portion 41 at one flange 42 of the profile and the flange is terminated by a hook portion 43. The other flange 44 of the profile is terminated by a female portion 45 intended to co-operate by snap-action with the male portion 26 of the side wall profile 23.

As can be seen from fig. 1 the outer part of the hook portion 43 has a height substantially less than the internal height of the rim 5a, 5b with the thickness of material of the lower horizontal portion 8 of the side wall 6 and through the oblique surface of the hook portion shown in fig. 6 the binding clamps 37 can be hooked into the bottom plate after the lower portion 8 of the side wall has been inserted into the rim 5a and 5b respectively. The binding clamps 37 are intended to be fixed to the wall portion 7 by means of self tap-

ping screws through the holes 40 and the wall portion 7 can for this purpose have a number of tiny holes.

It is evident that the mounting of the battery housing is done by placing the convection battery consisting of the convection elements 30 and the pipe 31 in its position, after which the binding clamps 37 are attached according to fig. 1, that is engaging the oblique portions 29 and 16 and snap locking of the lower portion is done by snapping the male portions 26 together with the female portions 45. Since the binding clamps 34 and 37 are narrow the element housings will be open upwardly and downwardly and the different parts of the elements will be kept permanently pressed against each other at which a good heat conduction between the different parts is ensured.

Due to the fact that the bottom plate of the ventilation duct projects laterally the air streaming out through the hole 3 will by ejector effect provide an air circulation downwardly in the battery housing.

The above described radiating- and convection unit can by that mainly be mounted in situ in a simple way and the parts contained therein can be produced to a low price.

In the unit described above the parts 7, 12 and 19a have to be attached to each other for example through point-welding.

In order to further rationalize the manufacture and to enable a complete mounting in situ the side wall 6 is in the embodiment shown in fig. 2 replaced by a side plate 6', which has a goose necked portion at 46 but lacks the bent upper portion 10, 11. Besides the bent portion 19a and 19b respectively of the upper wall of the ventilation duct continues in a portion 47 engaging the upper edge portion of the side wall and by that makes an oblique angle so that it can be engaged by the binding clamp 34'. This radiating- and convection element can by that be delivered in parts and is very little bulky and the mounting consists besides the tightening of the binding clamps 37 only of jointing and snapping operations.

For suspending the unit in a ceiling special ceiling attachments are used which also can engage the oblique parts in a way which can be seen in fig. 1.

In the modification shown in fig. 3 the upper part of the ventilation duct has the same shape as in fig. 1 but the side wall has an oblique part 49 engaging the part 19a and 19b respectively, which in turn is engaged by the respective binding clamp 34".

As can be seen from the lower part of fig. 6 the ventilation duct 1 can be provided with heating or cooling stripes. In the shown embodiment holders 50 for pipes for a heating or cooling medium are attached at the under side of the ventilation duct. For suspending the unit holes 52 for ceiling attachments can be arranged according to fig. 5. Only one side of the element has been described above but as can be seen from the drawing figures an embodiment is intended

according to which an element housing 2a is connected to one side of the ventilation duct and a second element housing 2b is connected to its other side, but also single sided arrangements as well as other combinations are of course possible.

It is evident that the convection battery 30, 31 will be permanently clamped between the walls 6 and 23 and that the clampings will be somewhat resilient, which insures a good heat conduction. Only snap connections have been mentioned above and by this term it as first hand meant a non-disconnectable and only little resilient connection.

The bottom plate 4 can be perforated and it can also have a chute for attachment of fluorescent tubes and the like.

Claims

1. A radiating- and convection unit preferably intended to be arranged below a ceiling and of the kind comprising an elongated ventilation duct (1), to both sides of which a battery housing (2) is connected, said battery housing is open upwardly and downwardly and is provided with a convection battery (30, 31), **characterized in**, that said radiating- and convection unit is composed by separate parts, a bottom plate (4), which is common for the ventilation duct (1) and the battery housings (2) and which plate has a longitudinal rim (5), a partition wall (6) common for the duct and the respective battery housing and which with a bent portion (8) is intended to engage said rim (5), outlet holes (3) being arranged in said partition wall (6) for ventilation air from said ventilation duct (1), a top plate (17) provided with side flanges (19) and connectable with the upper end portion of the partition walls (6) and an outer wall (23) laterally defining each battery housing, said outer wall being fixed to the partition wall (6) by means of a number of upper and lower binding clamps (34, 37) while simultaneously clamping the convection battery between said walls (6, 24).

2. A radiating- and convection unit according to claim 1, **characterized in**, that the lower binding clamp (39) has a U-shaped cross section and is connectable with the partition wall (6) with its mid portion between the shanks (42, 44), that the end portion of one of the shanks (44) is provided with a gripping member (45) which by snap action cooperates with a coupling member (26) extending from the outer wall (24), while the end portion (43) of the other shank (42) is intended to engage the rim (5) of the bottom plate (4).

3. A radiating- and convection unit according to claim 1 or 2, **characterized in**, that the battery housing (2a, 2b) have their lower end portions (25) located on a certain height above the projecting bottom plate (4) of the ventilation duct.

4. A radiating- and convection unit according to claim 1 and 2, **characterized in**, that the bent portion (8) of the partition wall (6) is provided with an upwardly bent end portion (9), which is in close contact with the bottom of the rim portion (5a, 5b) and makes a stop for the end portion (43) of the respective binding clamp (37) inserted into the rim portion.

5. A radiating- and convection unit according to claim 1, **characterized in**, that the ventilation duct (1) has an end gable (20) with discharge holes (21) or the like for throttling the air stream through the ventilation duct.

6. A radiating- and convection unit according to claim 1, **characterized in**, that the ventilation duct (1) has an upper wall (17) provided with a bent portion (47) engaging the upper portion of the side wall (6) of the ventilation duct, at which binding clamps (34) are arranged, which on one hand engage said bent portion (47) and the upper portion of the side wall (6) of the ventilation duct clasped thereby and on the other hand engage the upper end of the outer wall (23) of the battery housing (2a and 2b respectively).

7. A radiating- and convection unit according to claim 1, **characterized in**, that the side wall (6") of the ventilation duct in its upper end has a portion (49) engaging an upwardly bent portion (19a) of the upper wall (17) of the ventilation duct and that said portion (49) is shaped to be engaged by binding clamps (34"), which also engage the outer side wall of the battery housing (2a, 2b).

8. A radiating- and convection element according to claim 1, **characterized in**, that the side wall (6') of the ventilation duct, which also makes the inner side wall of the battery housing (2a, 2b), is provided with a step (47) making a support for the convection battery (30).

Patentansprüche

1. Heizkörpereinheit, vorzugsweise zur Anordnung unter einer Zimmerdecke bestimmt und vom einen länglichen Lüftungskanal (1), an dessen beiden Seiten ein Konvektorgehäuse (2) angebracht ist, aufweisenden Typ, wobei das genannte Konvektorgehäuse oben und unten offen ist und mit einer Konvektorgruppe (30, 31) versehen ist, **dadurch gekennzeichnet**, daß die genannte Heizkörpereinheit aus einzelnen Teilen besteht, einer dem Lüftungskanal (1) und dem Konvektorgehäuse (2) gemeinsamen Bodenplatte (4), die eine in Längsrichtung verlaufende Krempe (5) aufweist, einer dem Kanal und dem entsprechenden Konvektorgehäuse gemeinsamen Trennwand (6), die mit einem umgebogenen Bereich (8) zum Eingriff in die genannte Krempe (5) ausgebildet ist, wobei Auslaßöffnungen (3) für den Luftdurchzug vom genannten Lüftungskanal (1) in der genannten Trennwand (6) angeordnet

sind, einer seitlich mit Flanschen (19) versehenen Deckplatte (17), die mit dem oberen Endbereich der Trennwände (6) verbindbar ist, und einer Außenwand (23), die jedes Konvektorgehäuse seitlich begrenzt, wobei die genannte Außenwand mittels einer Anzahl oberer und unterer Verbindungsklammern (34, 37) an der Trennwand (6) befestigt ist, während gleichzeitig die Konvektorgruppe zwischen den genannten Wänden (6, 24) festgeklemt wird.

2. Heizkörpereinheit gemäß Patentanspruch 1, **dadurch gekennzeichnet**, daß die untere Verbindungsklammer (39) einen U-förmigen Querschnitt aufweist und mit ihrem Mittelteil zwischen den Schenkeln (42, 44) mit der Trennwand (6) verbindbar ist, daß der Endteil eines der Schenkel (44) mit einem Greiforgan (45) versehen ist, das einschnappend mit einem von der Außenwand (24) abstehenden Koppelorgan (26) zusammenarbeitet, während der Endteil (43) des anderen Schenkels (42) zum Eingriff in die Kreppe (5) der Bodenplatte (4) vorgesehen ist.

3. Heizkörpereinheit gemäß Patentanspruch 1 oder 2, **dadurch gekennzeichnet**, daß die unteren Endbereiche (25) der Konvektorgehäuse (2a, 2b) in einer gewissen Höhe oberhalb der vorstehenden Bodenplatte (4) des Lüftungskanals angeordnet sind.

4. Heizkörpereinheit gemäß Patentanspruch 1 und 2, **dadurch gekennzeichnet**, daß der umgebogene Bereich (8) der Trennwand (6) mit einem nach oben umgebogenen Endbereich (9) versehen ist, der mit dem Boden des Krepfenbereichs (5a, 5b) in engem Kontakt steht und für den Endteil (43) der entsprechenden, in den Krepfenbereich eingeschobenen Verbindungsklammer (37) einen Anschlag darstellt.

5. Heizkörpereinheit gemäß Patentanspruch 1, **dadurch gekennzeichnet**, daß der Lüftungskanal (1) eine Stimplatte (20) mit Austrittslöchern (21) oder ähnlichem zur Drosselung des durch den Lüftungskanal streichenden Luftstroms aufweist.

6. Heizkörpereinheit gemäß Patentanspruch 1, **dadurch gekennzeichnet**, daß der Lüftungskanal (1) eine obere Wand (17) aufweist, die mit einem umgebogenen Bereich (47) versehen ist, in den der obere Bereich der Seitenwand (6) des Lüftungskanals eingreift, an der Verbindungsklammern (34) angeordnet sind, die einerseits den genannten umgebogenen Bereich (47) und den oberen Bereich der Seitenwand (6) des Lüftungskanals umgreifen, die dadurch zusammengeklammert werden, und andererseits das obere Ende der Außenwand (23) des Konvektorgehäuses (2a bzw. 2b).

7. Heizkörpereinheit gemäß Patentanspruch 1, **dadurch gekennzeichnet**, daß die Seitenwand (6'') des Lüftungskanals an ihrem oberen Ende einen Bereich (49) aufweist, der einen nach oben umgebogenen Bereich (19a) der oberen Wand (17) des Lüftungskanals umgreift, und daß der genannte Bereich (49) dafür geformt ist, durch Verbindungsklammern

(34'') umgriffen zu werden, die ebenfalls die äußere Seitenwand des Konvektorgehäuses (2a, 2b) umgreifen.

8. Heizkörpereinheit gemäß Patentanspruch 1, **dadurch gekennzeichnet**, daß die Seitenwand (6') des Lüftungskanals, die gleichzeitig die innere Seitenwand des Konvektorgehäuses (2a, 2b) darstellt, mit einem Absatz (46) versehen ist, der der Konvektorgruppe (30) als Träger dient.

Revendications

1. Unité à rayonnement et convection prévue de préférence pour être installée sous un plafond et du type comportant une conduite de ventilation allongée (1), sur les deux côtés de laquelle est relié un logement de batterie (2), ledit logement de batterie est ouvert vers le haut et vers le bas et est pourvu d'une batterie de convection (30, 31), caractérisée en ce que ladite unité à rayonnement et convection se compose de pièces séparées, une plaque inférieure (4), qui est commune à la conduite de ventilation (1) et aux logements de batterie (2) et qui possède un rebord longitudinal (5), une paroi de séparation (6) commune à la conduite et au logement de batterie respectif et qui est prévue pour venir contre ledit rebord (5) avec une partie pliée (8), des trous de sortie (3) pour de l'air de ventilation provenant de ladite conduite de ventilation (1) étant disposés dans ladite paroi de séparation (6), une plaque supérieure (17) pourvue de rebords latéraux (19) et pouvant être reliée à la partie d'extrémité supérieure des parois de séparation (6) et une paroi extérieure (23) définissant latéralement chaque logement de batterie, ladite paroi extérieure étant fixée à la paroi de séparation (6) au moyen de plusieurs agrafes de serrage supérieures et inférieures (34, 37) tout en serrant simultanément la batterie de convection entre lesdites parois (6, 24).

2. Unité à rayonnement et convection selon la revendication 1, caractérisée en ce que l'agrafe de serrage inférieure (39) présente une section en U et peut être reliée à la paroi de séparation (6) par sa partie médiane entre les branches (42, 44), en ce que la partie d'extrémité d'une des branches (44) est pourvue d'un élément de saisie (45) qui, par encliquetage, coopère avec un élément d'accouplement (26) s'étendant depuis la paroi extérieure (24), alors que la partie d'extrémité (43) de l'autre branche (42) est prévue pour venir contre le rebord (5) de la plaque inférieure (4).

3. Unité à rayonnement et convection selon la revendication 1 ou 2, caractérisée en ce que les logements de batterie (2a, 2b) ont leurs parties d'extrémité inférieure (2S) situées à une certaine hauteur au-dessus de la plaque inférieure saillante (4) de la conduite de ventilation.

4. Unité à rayonnement et convection selon les revendications 1 et 2, caractérisée en ce que la partie pliée (8) de la paroi de séparation (6) est pourvue d'une partie d'extrémité repliée vers le haut (9), qui est en contact étroit avec le fond de la partie de rebord (5a, 5b) et constitue une butée pour la partie d'extrémité (43) de l'agrafe de serrage respective (37) insérée dans la partie de rebord. 5

5. Unité à rayonnement et convection selon la revendication 1, caractérisée en ce que la conduite de ventilation (1) possède un raccord d'extrémité (20) avec des orifices de sortie (21) ou équivalents destinés à restreindre le flux d'air à travers la conduite de ventilation. 10

6. Unité à rayonnement et convection selon la revendication 1, caractérisée en ce que la conduite de ventilation (1) possède une paroi supérieure (17) pourvue d'une partie repliée (47) venant contre la partie supérieure de la paroi latérale (6) de la conduite de ventilation, au niveau de laquelle sont disposées les agrafes de serrage (34), qui d'une part viennent contre ladite partie repliée (47) et la partie supérieure de la paroi latérale (6) de la conduite de ventilation ainsi serrée et d'autre part vient contre l'extrémité supérieure de la paroi extérieure (23) du logement de batterie (respectivement 2a et 2b). 15 20 25

7. Unité à rayonnement et convection selon la revendication 1, caractérisée en ce que la paroi latérale (6'') de la conduite de ventilation à son extrémité supérieure possède une partie (49) venant contre une partie pliée vers le haut (19a) de la paroi supérieure (17) de la conduite de ventilation et en ce que ladite partie (49) est conformée de façon à être saisie par des agrafes de serrage (34'') qui viennent également contre la paroi latérale extérieure du logement de batterie (2a, 2b) ; 30 35

8. Unité à rayonnement et convection selon la revendication 1, caractérisée en ce que la paroi latérale (6') de la conduite de ventilation, qui constitue également la paroi latérale intérieure du logement de batterie (2a, 2b), est pourvue d'un épaulement (47) constituant un support pour la batterie de convection (30). 40

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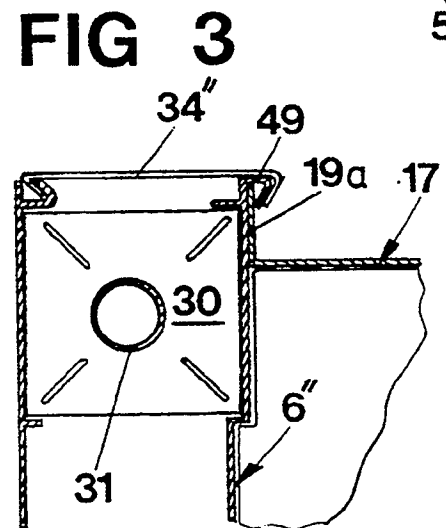
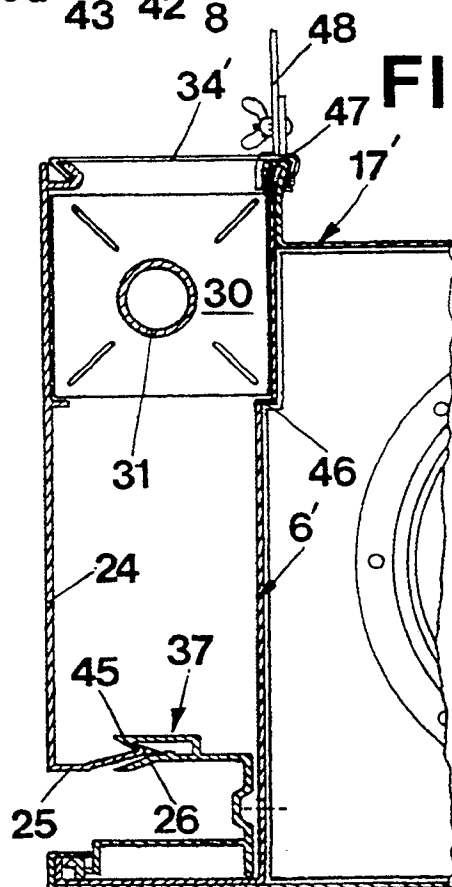
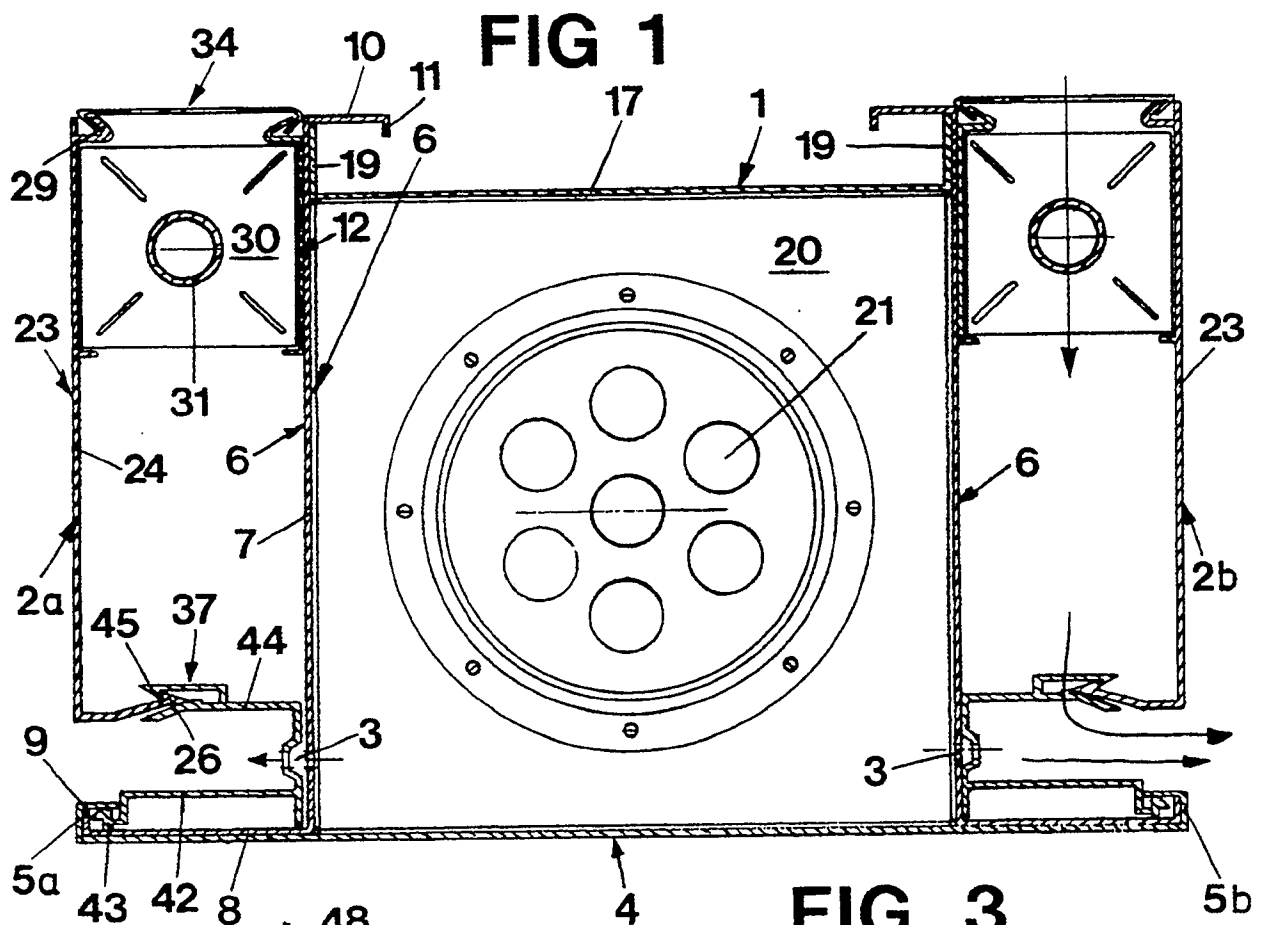


FIG 4

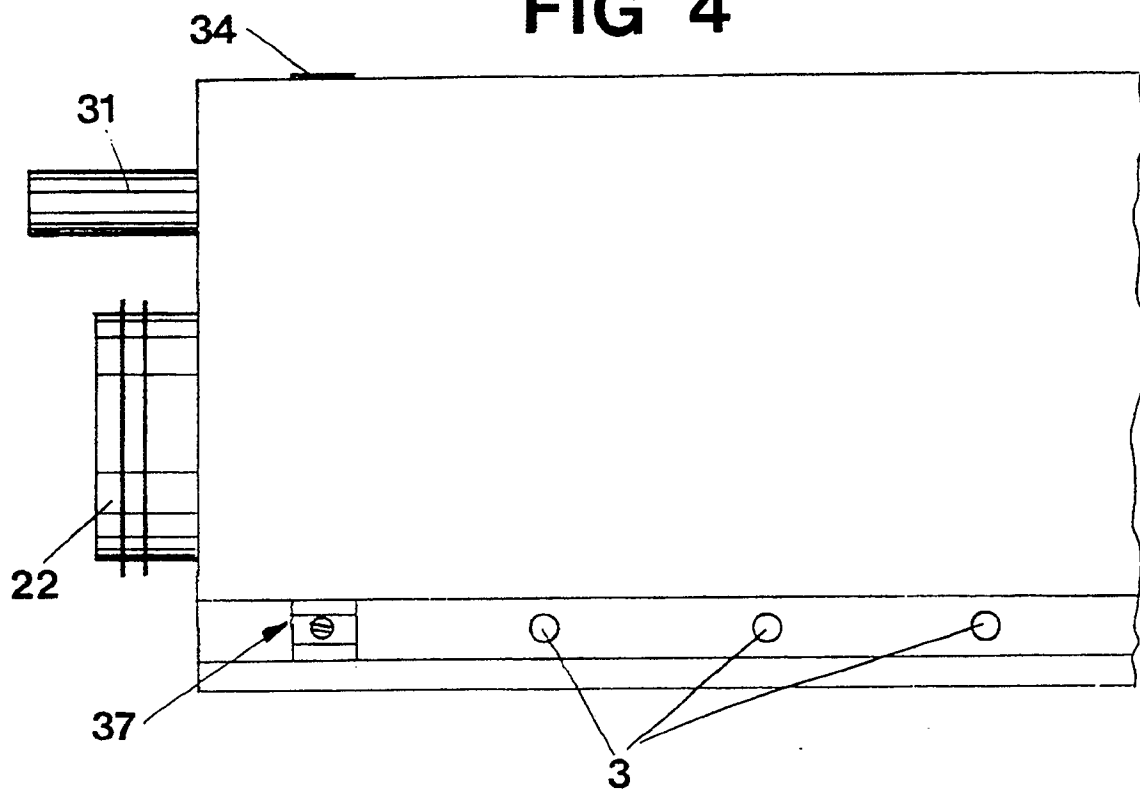


FIG 5

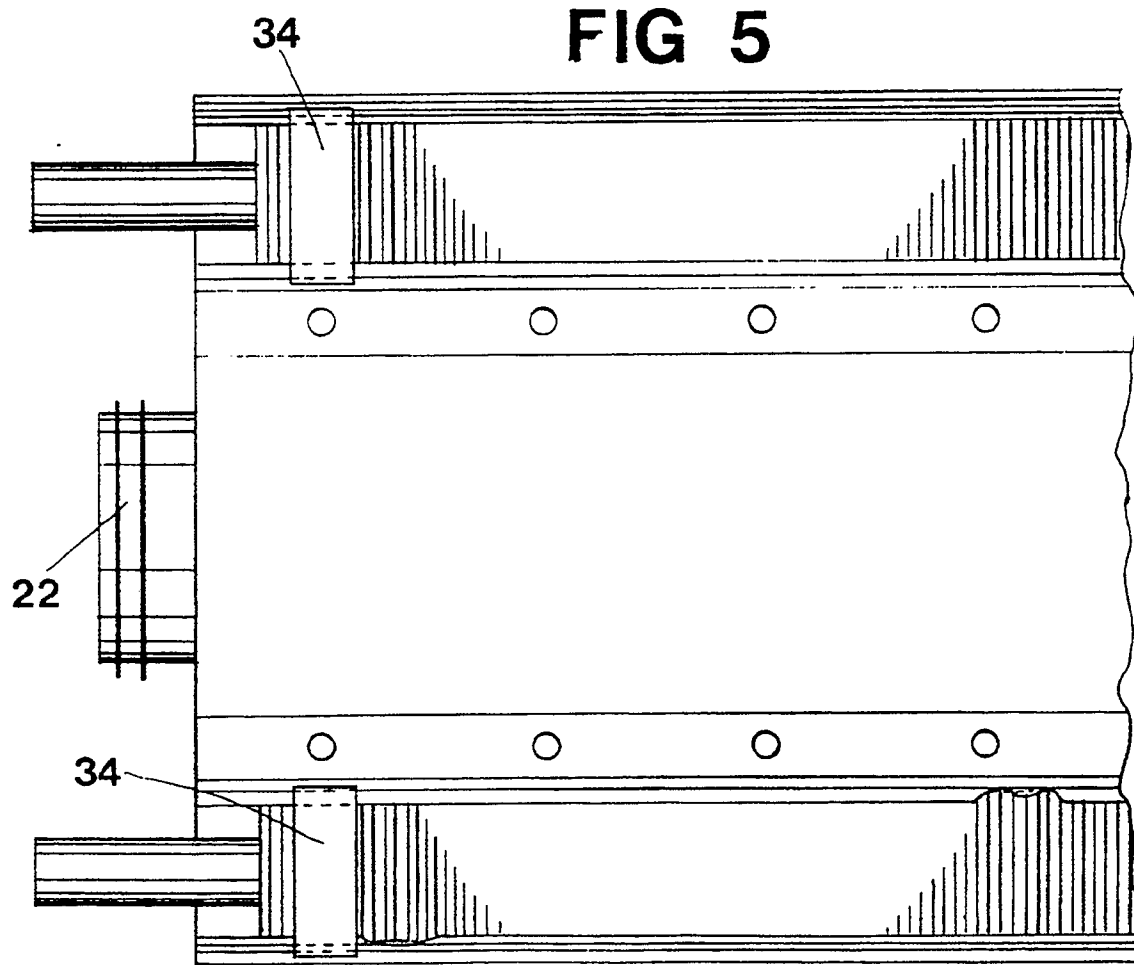


FIG 6

