



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.10.2008 Bulletin 2008/44

(51) Int Cl.:
F24F 13/06 (2006.01)

(21) Application number: **08155037.8**

(22) Date of filing: **23.04.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

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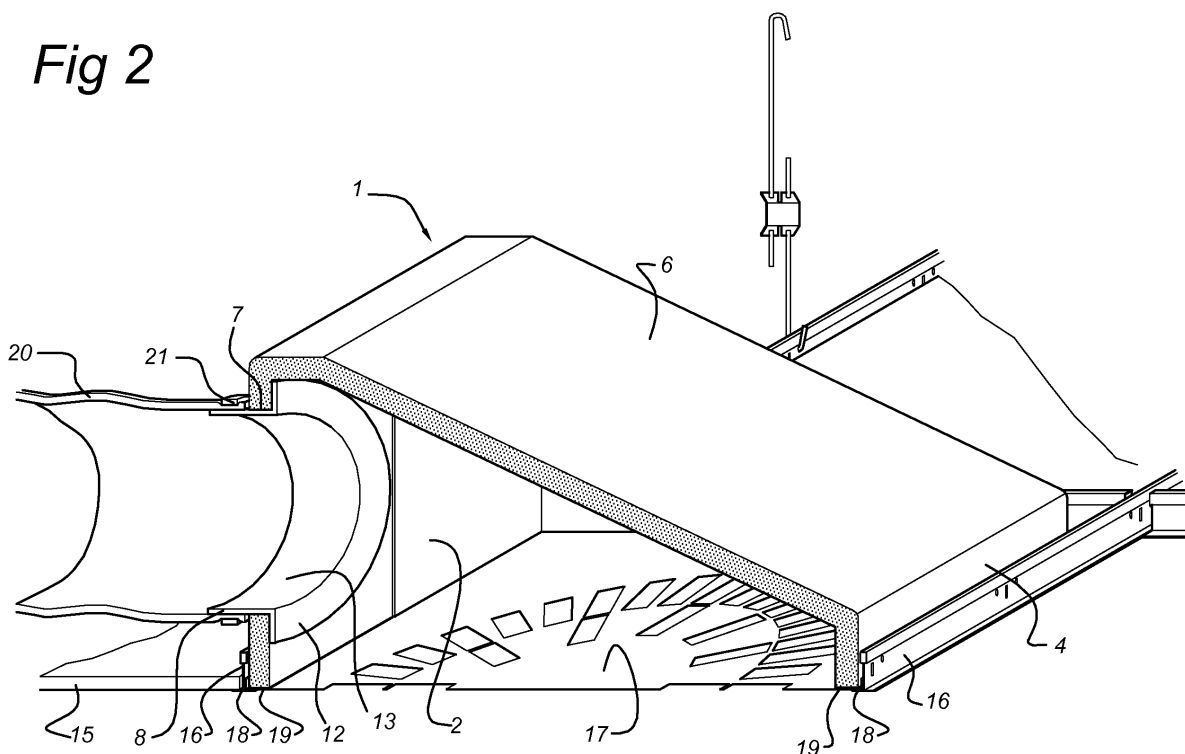
(30) Priority: **23.04.2007 NL 2000603**

(54) **Air plenum**

(57) Air plenum for use in an air-conditioning system, attached in ceilings of buildings or other constructions. The air plenum is cap-like in its configuration with a large opening adjoining an opening to be formed in the ceiling or a ceiling plate such as an air grate. On the other hand, one of the upright sides thereof is provided with a flange for connection to a flexible hose. The invention proposes making an air plenum of this type of a plastics material,

in particular an expanded polypropylene (co)polymer. According to one variation of the invention, the upper side of the cap-like body extends (in the use position) at an inclination, i.e. inclines in the use position from the location at which the connection to the hose is established to the opposing side. The flange for the connection to the flexible air supply/discharge hose is preferably made of a metallic material and is inserted into an opening in the respective side of the cap-like body.

Fig 2



Description

[0001] The present invention relates to an air plenum comprising a cap-like body with sides which are upright in the use position, a cover connecting the upright sides and an opening opposing said cover, one of said upright sides or said cover being provided with a connection flange for a hose.

[0002] An air plenum is generally known in the art and is used in most ceilings in which air is supplied or discharged via the ceiling. Plenums of this type are used in the aeration/discharge openings formed in the ceiling and, on the other hand, are connected to a flexible hose which is in turn connected to the duct system which supplies/discharges the air.

[0003] In the prior art, air plenums of this type are made of sheet material, more particularly galvanized steel sheet. As a result, air plenums of this type are comparatively heavy. In order to provide good properties with regard to insulation, it is conventional to provide the plenums with an insulating lining. Either sound or heat insulation can be used for this purpose. Heat insulation is used above all in air plenums used to supply cooled and/or heated air.

[0004] The provision of insulation further increases the costs of an air plenum of this type.

[0005] It is the object of the present invention to provide an air plenum which is simple to manufacture, easy to handle and can be manufactured at a comparatively low cost price.

[0006] In the case of an above-described air plenum, this object is realised in that the cap-like body is made of an expanded propene (co)polymer.

[0007] The use according to the present invention of expanded propene (co)polymer, and more particularly a polypropene (polypropylene) copolymer surprisingly provides a cap-like body which, with a comparatively limited wall thickness, such as for example from 10 mm or 15 mm, has a sufficiently structural strength. In addition, it has been found that a material of this type is particularly simple to shape, thus producing a comparatively light cap-like body which is accordingly easy to handle. In addition, the material which is used has outstanding insulating properties, with regard to both sound and heat. In addition, it has been found that a material of this type does not absorb moisture and is not influenced by moisture. In addition, it is easily possible to recycle a material of this type and recycled material may optionally be used. As a result, a plenum of this type is particularly environmentally friendly.

[0008] Furthermore, the absence of any sharp edges means that there is no risk of injury during installation. In addition, the much lower weight compared to steel plenum boxes means that it is possible to position these plenums according to the present invention directly on grates in a ceiling construction without providing further suspension on the structure located thereabove. Such suspension is necessary in steel plenum boxes because

the plenum box is so heavy that there is a risk of the ceiling subsiding or worse.

[0009] It is possible to form the connection to a further duct, such as a flexible hose, directly in the above-mentioned material. However, a separate part is preferably used for this purpose. More particularly, it is proposed to form in the respective side or cover of the plenum an opening and to attach in an opening of this type a, preferably metallic, ring to which a hose, which can be connected to the respective flange using, for example, a hose clamp or other fastening, can be attached.

[0010] As a result of the comparatively high thickness of the material compared to metallic plenums, it is not necessary to attach a separately configured part to the underside, i.e. the connection to the ceiling construction, in order to provide a sufficiently large area of contact with, for example, an air grate of a ceiling. The end surface of the cap-like body is sufficiently wide to provide direct fastening to an air grate. A fastening of this type can, for example, include the use of a double-sided adhesive strip or tape.

[0011] According to a further advantageous embodiment of the invention, the air plenum can in particular save space, save material and be configured so as to function in an expedient manner as a result of the fact that the upper side thereof (in the use position) extends at an inclination. In other words, the highest point is preferably found on the side to which the hose or other duct of the air-conditioning system is connected and the lowest height is encountered on the opposing side. Preferably, the highest height is at least 3 times the lowest height. In this way, a number of plenums can expediently be supplied to the user's premises in a surrounding packaging such as a case. It will be appreciated that in a ceiling of a somewhat larger building, large numbers of plenums of this type are used, as a result of which any saving on transportation costs is welcome and affects the installation price.

[0012] Preferably, the air grate is in particular configured for receiving the plenum. For this purpose, the air grate can be provided with upright edges. In addition, it is possible to provide the plenum in proximity to said edges or other centring parts with recesses for precise enclosure of the plenum within the air grate.

[0013] The air grate can form part of a ceiling construction consisting of (inverted) T-shaped profiles. Ceiling plates are attached between adjacent T-shaped profiles and one or more of the ceiling plates can be provided with the above-described grates on which the plenum can be positioned.

[0014] The invention will be described hereinafter in greater detail with reference to an exemplary embodiment illustrated in the drawings, in which:

Fig. 1 shows the plenum according to the invention in the inverted position to illustrate the underside thereof; and

Fig. 2 shows the plenum according to the present invention attached in a ceiling construction.

[0015] In the figures, the plenum or the cap according to the present invention is denoted in its entirety by reference numeral 1. The plenum is made of an expanded propene (co)polymer and more particularly of expanded polypropylene polymer. The material has a wall thickness of preferably greater than 10 mm and more particularly greater than 15 mm and more preferably about 18 mm. At a substantial wall thickness of this type, the low specific weight of the material which is used will still provide a cap having an especially low mass.

[0016] The cap consists of upright sides 2-5, the highest side being denoted by 2. The height thereof is denoted by H. The lowest side is denoted by 4 and has a height h. Preferably, H is at least 3 x h. An opening 7 is formed in the highest side H. A flange 8 protrudes from this opening.

[0017] As may be seen from Fig. 2, this flange 8 forms part of a metal support ring 13 which comprises a flange part 12 and during fitting comes from the inside of the plenum 1 to rest against the wall part, directly surrounding the opening 7, of the side 5. Optionally, a secure fastening can be produced using glue or in a different manner. In addition, Fig. 1 shows the presence of the opening 9 which should be positioned opposing the air grate during use.

[0018] This positioning will be described in greater detail with reference to Figure 2. Reference numeral 16 denotes two remote inverted T-shaped profiles between which ceiling plates 15 and 17 extend. In the present case, the ceiling plate 17 is configured as a grate with upright edge parts 18 for receiving therebetween the cap 1. At the location of the upright edges, the cap 1 is provided with recesses 10. The cap 1 can be fastened to the grate 17 by the attaching of tape 19. It is however also possible to attach the cap 1 by clamping or in a different manner. The upright side 2, more particularly the flange 8 thereof protruding at this location, is connected to the flexible hose 20. Fastening is carried out with a hose clamp 21.

[0019] On reading the foregoing, a person skilled in the art will immediately think of variations of the present invention which fall within the scope of the accompanying claims and are obvious.

[0020] In addition, protection is expressly sought for the subject-matter of the sub-claims without combination with Claim 1, more particularly with respect to the variation described in Claims 5 et seq.

Claims

1. Air plenum (1) comprising a cap-like body with sides (2-5) which are upright in the use position, a cover (6) connecting the upright sides and an opening (9) opposing said cover, one of said upright sides (5) or

said cover being provided with a connection flange (8) for a hose (20), **characterized in that that** cap-like body is made of an expanded propene (co)polymer.

2. Air plenum according to Claim 1, wherein that expanded propene (co)polymer comprises expanded polypropene.
3. Air plenum according to either of the preceding claims, wherein an upright side or the cover (2) is provided with an opening (7) in which a metallic connection flange (8) for a hose (20) is attached.
4. Air plenum according to one of the preceding claims, wherein during the horizontal positioning of the free ends of said upright sides, said cover (6) extends at an inclination.
5. Air plenum according to Claim 4, wherein said cover extends at an inclination from a highest point in proximity to said side (2) provided with the connection flange to a lowest point on the side opposing said side provided with the connection flange.
6. Air plenum according to Claim 4 or 5, wherein said cover is located at the highest point at a distance (H) from the free end delimitation of that cap-like body and wherein said cover is located at the lowest point at a distance (h) from the free end delimitation of that cap-like body, wherein H is at least 3 x h.
7. Air plenum according to one of the preceding claims, wherein that expanded propene (co)polymer has a thickness of at least 10 mm.
8. Air plenum according to Claim 7, wherein that expanded propene (co)polymer has a thickness of at least 15 mm.
9. Aeration/deaeration for a ceiling (15) comprising an air grate (17) and an air plenum (1) connecting there- to according to one of the preceding claims.
10. Aeration/deaeration according to Claim 9, wherein the air grate is provided with edge parts (18) which are upright in the use position and within which the air plenum extends.
11. Air plenum according to Claim 10, wherein the air plenum is provided with recesses (10) at the location of the upright edge parts (18).
12. Ceiling construction comprising two remote T-shaped profiles (16), a ceiling plate (17) which is attached therebetween with aeration/deaeration according to one of Claims 9-11.

13. Aeration/deaeration according to one of Claims 9-11, wherein a double-sided adhesive strip (19) is attached between that air grate (17) and said air plenum.

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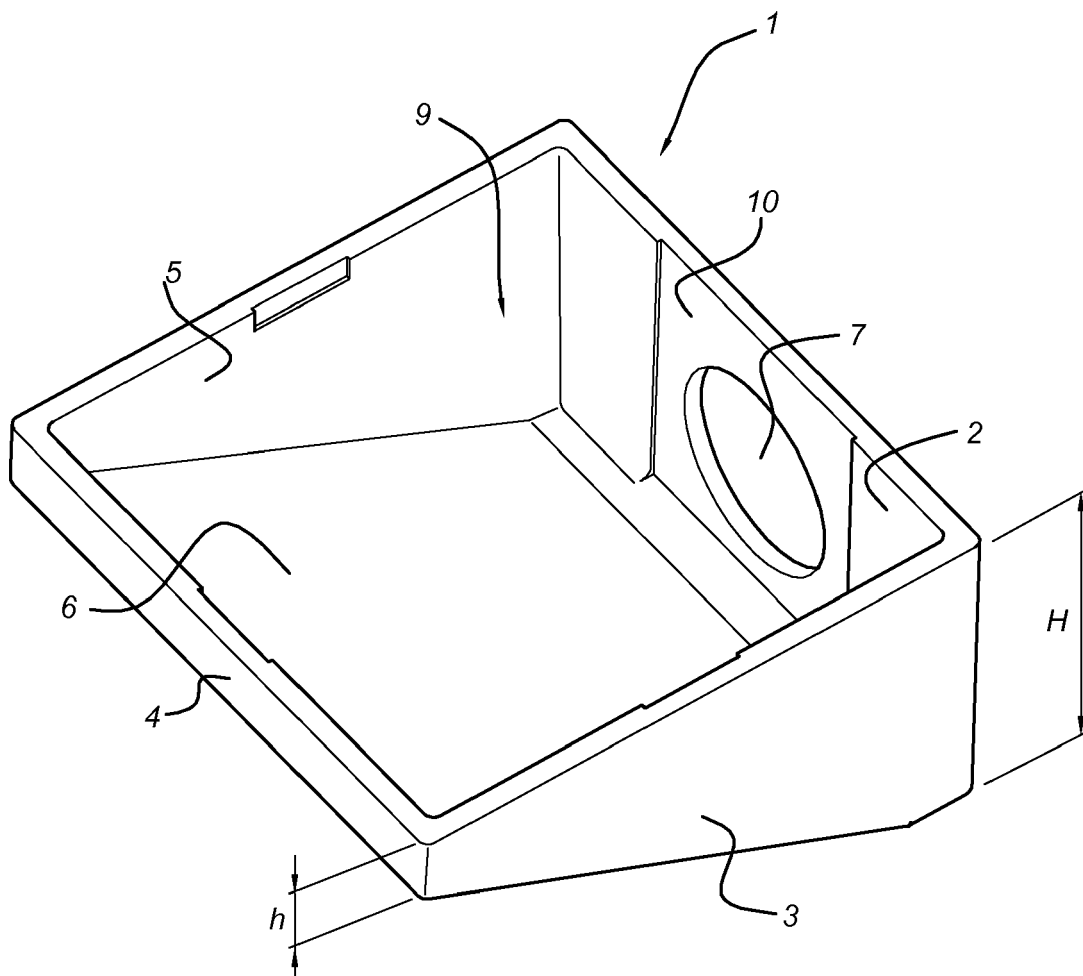
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Fig 1



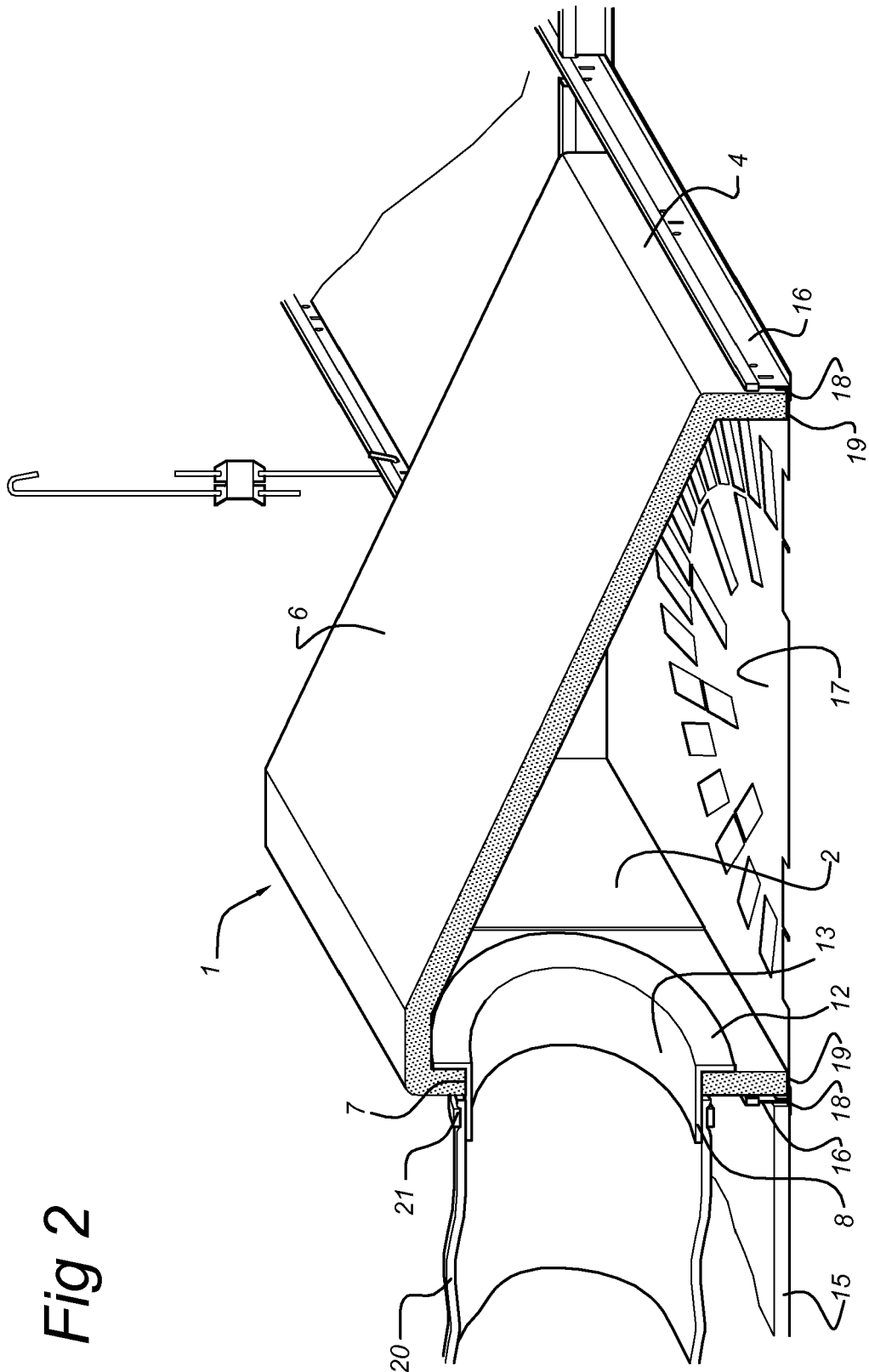


Fig 2

Fig 3

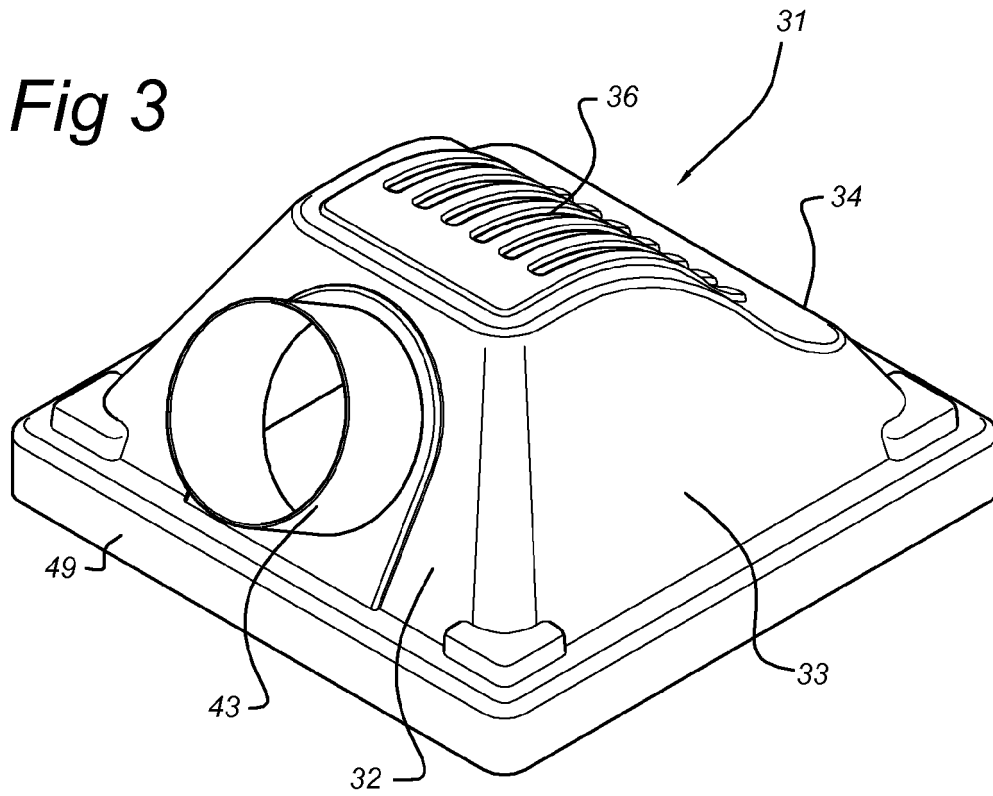


Fig 4

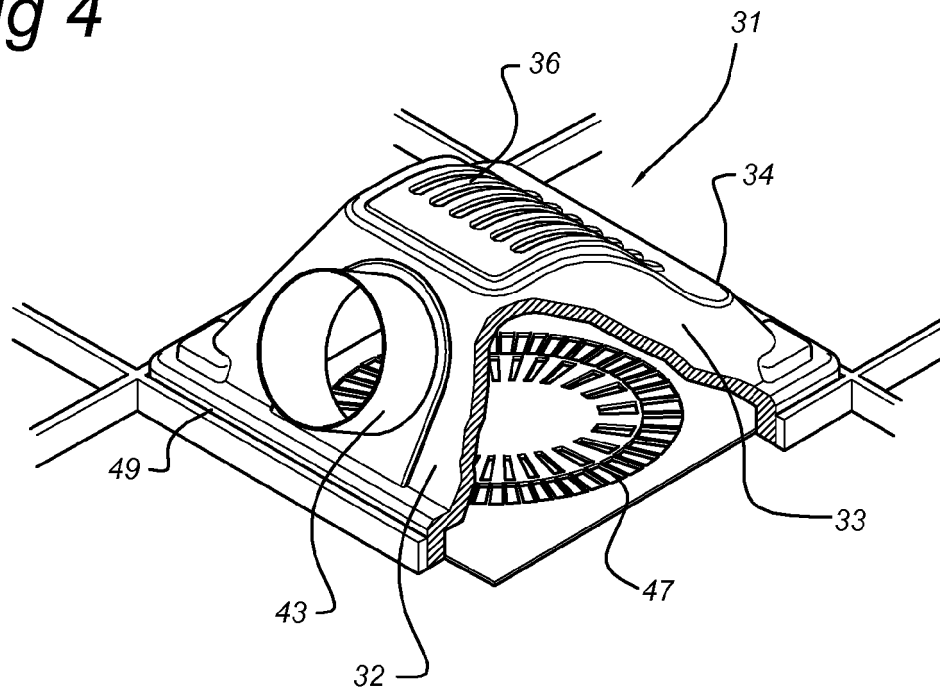
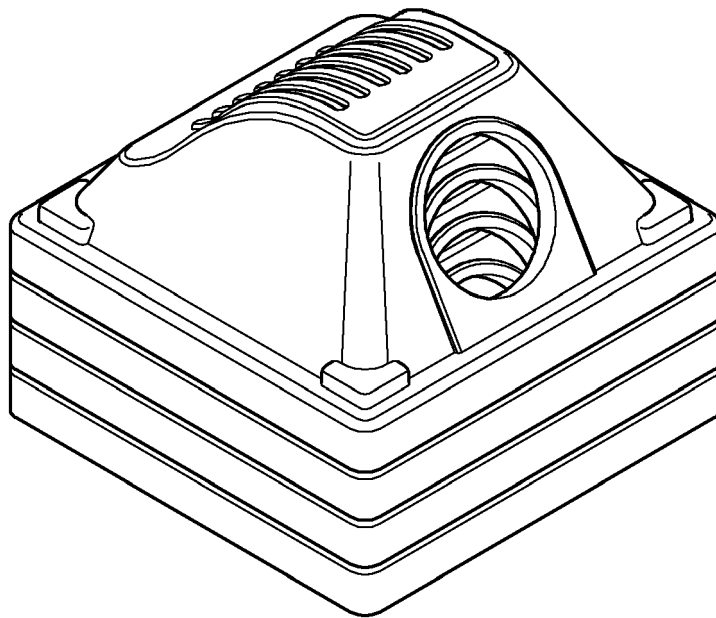


Fig 5





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 5037

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X	US 5 219 403 A (MURPHY GERARD C [US]) 15 June 1993 (1993-06-15)	1-3,7-12	INV. F24F13/06
Y	* column 4, line 59 - line 61; figure 3 *	4-6	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 January 2008	Examiner de Graaf, Jan Douwe
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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