

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 1 614 877 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:

**11.01.2006 Bulletin 2006/02**

(51) Int Cl.:

**F02B 63/04 (2006.01)****F02B 77/13 (2006.01)**(21) Application number: **05076370.5**(22) Date of filing: **13.06.2005**

(84) Designated Contracting States:

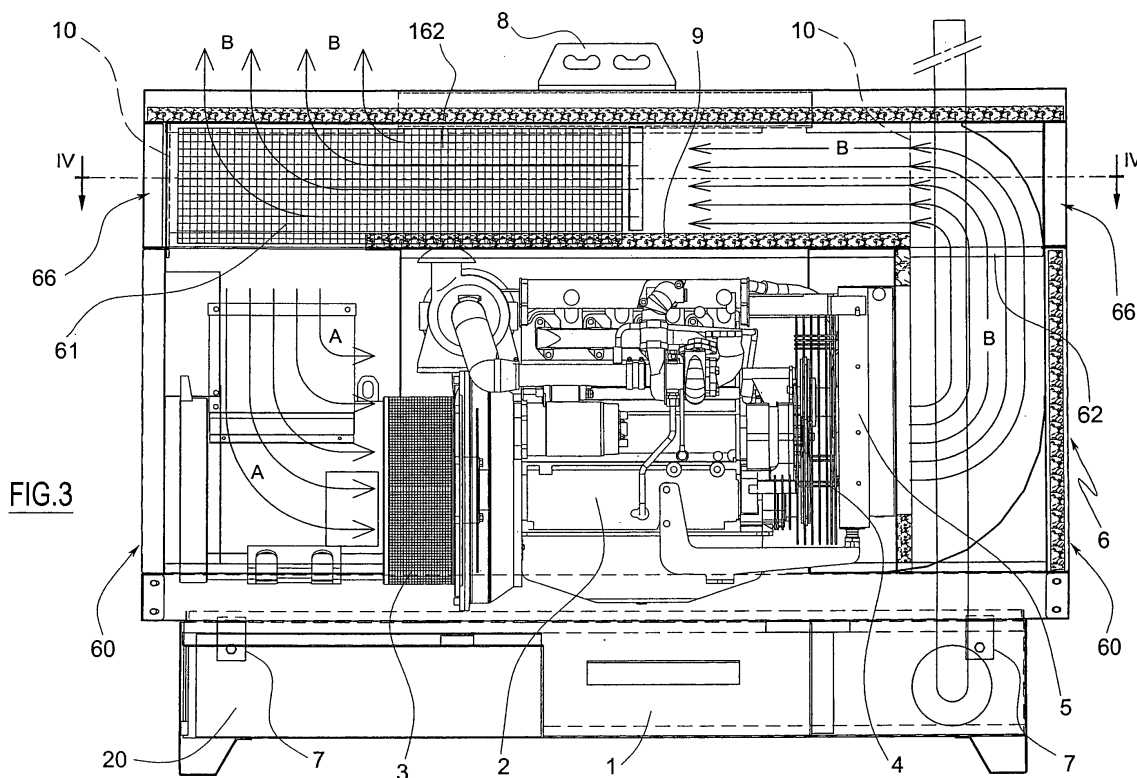
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**

Designated Extension States:

**AL BA HR LV MK YU**(72) Inventor: **Bovi, Fabio****c/o Eurosystems S.P.A.****42045 Luzzara (Reggio Emilia) (IT)**(74) Representative: **Corradini, Corrado et al****Studio Ing. C. CORRADINI & C. S.r.l.****4, Via Dante Alighieri****42100 Reggio Emilia (IT)**(30) Priority: **06.07.2004 IT RE20040079**(71) Applicant: **Eurosystems S.P.A.****I-42045 Luzzara (Reggio Emilia) (IT)**(54) **Improved generating set**

(57) Generator set, comprising an internal combustion engine (2) that is fitted onto a platform (1), and at the opposite axial ends of which are associated a current generator (3) and a cooling fan (4) suitable for creating a flow of fresh air that flows according to the direction taken up by the axis of the engine, where said platform is equipped with an overlying sound-proofed shell (6) that

provides, at the bottom, a surrounding case (60) that contains the engine and its additional parts, and takes care of channelling the flow of fresh air in transit, and at the top a service chamber that provides two manifolds for fresh air and exhaust air respectively, the first of which places the outside in communication with one end of the case, and the second of which places the opposite end of the case in communication with the outside.

**FIG. 3****EP 1 614 877 A1**

## Description

**[0001]** The present finding refers to improvements made to sets for generating current in generals, be they fixed or mobile.

**[0002]** More specifically, it concerns a system for silencing said current generator sets.

**[0003]** These generator sets, a typical use of which is in emergencies, for example to provide electrical energy to the essential apparatuses of a hospital in the case of a black-out, briefly comprise an electrical machine, like an alternator, which is driven by a combustion engine, generally a Diesel-cycle internal combustion engine, all being installed on a suitable platform.

**[0004]** The internal combustion engine is generally cooled by water, which flows in a radiator that is crossed by a flow of air driven by a fan controlled by the engine, and intended to cool down both the engine and the alternator. During operation, such generator sets are generally rather noisy and therefore there is a requirement to cut out or reduce as much as possible its noisiness, without of course altering the characteristics of the overall cooling system for obvious reasons.

**[0005]** The main purpose of the finding is, indeed, that of providing a silencing system for such generator sets that is able to fulfil the quoted requirement.

**[0006]** Another purpose of the finding is that of making a sound-proofing system that, as well as having excellent silencing properties, allows access to the various parts of the generator set, for example for control and maintenance interventions, both general and specific, in a particularly simple, quick and easy manner.

**[0007]** A further purpose consists of making a sound-proofing system capable of achieving the quoted goals in the context of a simple, rational, functional, strong and cost-effective constructive solution.

**[0008]** Said purposes are achieved thanks to the characterising elements indicated in the main claim.

**[0009]** Preferred and advantageous embodiments are outlined in the dependent claims.

**[0010]** In a totally general manner, said generator set is of the type outlined in the preamble, or rather it comprises an internal combustion engine that is fitted onto a platform, and at the opposite axial ends of which are associated a current generator and a cooling fan suitable for creating a flow of fresh air that flows generally according to the direction taken up by the axis of the engine, typically in the direction that goes from the current generator to the cooling fan.

**[0011]** In accordance with the finding, said platform is provided with an overlying generally parallelepiped sound-proofing shell that provides, at the bottom, a surrounding case that contains the engine and its additional parts, and takes care of channelling the cooling air flow, and at the top, a service chamber that provides two manifolds for fresh air and exhaust air, respectively, the first of which places the outside in communication with the underlying area of the case intended for the current gen-

erator, and the second of which places the underlying area of the case intended for the fan in communication with the outside.

**[0012]** Preferably, the flow of air between case and manifolds takes place through a horizontal wall that separates case and chamber.

**[0013]** Said horizontal wall preferably consists of a sound-absorbing baffle.

**[0014]** Thanks to the structure outlined above, the set is practically completely surrounded by a sound-proofed jacket, obviously apart from the ports for the passage of fresh air coming in and exhaust air going out, respectively, which allows a drastic reduction in noise as has been able to be seen following specific tests carried out on various types of generator sets, obviously tested with and without the silencing system according to the finding.

**[0015]** The same tests have also allowed the excellent cooling characteristics of the generator set thus jacketed to be detected.

**[0016]** Moreover, said sound-proofed shell preferably consists of a box-shaped body that is open at the bottom suitable for resting on the engine-carrying platform, and removably fixed there through threaded members so as to totally uncover the engine in a short space of time.

**[0017]** Advantageously, said box-shaped body has hatches and removable panels intended for localised interventions.

**[0018]** Thanks to the special characteristics indicated above all of the purposes of the finding are thus achieved.

**[0019]** The characteristics and constructive advantages of the finding shall become clear from the following detailed description, given with reference to the figures of the attached tables of drawings that illustrate a particular and preferred embodiment thereof, purely as an example and not for limiting purposes, and where:

Fig. 1 is a perspective view that shows the finding from the fresh air entry side.

Fig. 2 is a view totally similar to the previous one that shows the finding from the exhaust air exit side.

Fig. 3 is an enlarged transparent view obtained according to the direction III indicated in Fig. 2.

Fig. 4 is the section IV-IV indicated in Fig. 3.

**[0020]** From the quoted figures a strong metal platform 1 can be seen (figs. 1 to 3) on which a generator set is installed.

**[0021]** It should be specified that the platform 1 can be of the type intended to be fixed to the floor, or of the type suitable for being arranged on a mobile, self-propelled or dragged means.

**[0022]** The generator set is of the known type and comprises, in short, an internal combustion engine 2, generally with Diesel-cycle, which on one side (on the left in fig. 3) is kinematically coupled with a current generator 3, typically an alternator, and on the other side (on the right in the same figure) is kinematically connected to a fan 4 with a radiator 5 in front for circulating the cooling

water for the engine 2.

[0023] With reference to the engine 2, the fan 4 creates a flow of air that generally runs parallel to its axis in the direction that goes from the alternator 3 to the radiator 5 (see fig. 3).

[0024] The fresh air that reaches the generator set from the outside is indicated with A in the figures, whereas the exhaust air that leaves the generator set and discharges to the outside is indicated with B.

[0025] The elements making up the quoted generator set are received in the bottom part of a generally parallelepiped insulated shell 6 with a rectangular plan (figs. 1, 2 and 4).

[0026] The shell 6 is open at the bottom so as to be able to be slotted from above onto the platform 1, and be removably fixed there.

[0027] This takes place through a series of perforated ears 7 that stem from the lower edge of the shell 6, and that carry respective locking through screws (see fig. 3). In order to move the shell 6, once again see fig. 3, two lugs or handles 8 are foreseen on top.

[0028] The same shell 6 is equipped with a horizontal separator baffle 9 (figs. 3 and 4) that divides it into a bottom case 60 and a top chamber 66 communicating with each other, where the first 60 encloses the generator set and the second 66 acts as a passage for the respective flows of fresh air A and exhaust air B.

[0029] The side walls and the top of the shell 6, as well as the quoted separator baffle 9, individually consist of a generally cornice-shaped frame the port of which is buffered by at least one sound-proofing sound-absorbing panel.

[0030] Between the top and bottom of said top chamber 66 a vertical dividing wall 10, consisting of sheets of metal plate and sound-absorbing panels is arranged, which in plan (fig. 4) has a sinuate extension developing substantially according to a diagonal of the shape in plan of said chamber 66.

[0031] In such a way the chamber 66 is divided into two areas that in plan have substantially the shape of an elongated right-angled triangle extending generally parallel to the axis of the underlying engine 2 (fig. 4).

[0032] One of said areas, the one in the top left in fig. 4, acts as a manifold for fresh air A, and the other area, in the bottom right of the same figure, acts as a manifold for exhaust air B.

[0033] In particular, the manifold for fresh air A communicates with the area of the case 60 intended for the alternator 3 (fig. 3) through a generally trapezium-shaped horizontal opening 61 that is formed on the baffle 9 (fig. 4), and with the outside through a vertical window 161 equipped with a grate (fig. 1).

[0034] Said horizontal opening 61 and said vertical window 161 are arranged in substantially opposite positions with respect to the longitudinal development of the manifold for fresh air A (fig. 3).

[0035] Similarly, the manifold for exhaust air B communicates with the area of the case 60 intended for the

alternator 3 (fig. 3) through a rectangular-shaped horizontal opening 62 that is formed on the baffle 9 (fig. 4), and with the outside through a vertical window 162 equipped with a grate (figs. 2 and 3).

5 [0036] Said horizontal opening 62 and the respective vertical window 162 are arranged in substantially opposite positions with respect to the longitudinal development of the manifold for exhaust air B (fig. 3).

10 [0037] Moreover, to access the different parts of the generator set without having to remove the shell 6 as explained previously, and to access the different inner areas of the same shell 6, it is equipped with hatches and removable panels as is clearly illustrated in figs. 1 and 2.

15 [0038] Finally, it is advantageously foreseen that the fuel tank, indicated with 20 in fig. 3, is removably arranged in a suitable side space formed on the platform 1. The special characteristics and advantages of the finding can clearly be understood from the above and from the examination of the attached figures.

## Claims

1. Generator set, comprising an internal combustion engine (2) that is fitted onto a platform (1), and at the opposite axial ends of which are associated a current generator (3) and a cooling fan (4) suitable for creating a flow of fresh air that flows according to the direction taken up by the axis of the engine, **characterised in that** said platform is equipped with an overlying sound-proofed shell (6) that provides, at the bottom, a surrounding case (60) that contains the engine and its additional parts, and takes care of channelling the flow of fresh air in transit, and at the top a service chamber that provides two manifolds for fresh air and exhaust air respectively, the first of which places the outside in communication with one end of the case, and the second of which places the opposite end of the case in communication with the outside.
2. Set according to claim 1, **characterised in that** the flow of the air between case and manifolds takes place through a horizontal wall that separates said case and chamber.
3. Set according to claim 2, **characterised in that** said horizontal wall consists of a baffle with sound-absorbing properties.
4. Set according to claim 1, **characterised in that** said manifolds are separated by a vertical divider wall arranged between the top and the bottom of said chamber.
5. Set according to claim 4, **characterised in that** each of said manifolds has, at one end, a horizontal opening formed on the bottom of said chamber and open-

ing into the case below, and, at the opposite end, a vertical window communicating with the outside that is formed on the side wall of the chamber.

6. Set according to claim 5, **characterised in that** said dividing wall consists of a structure with sound-absorbing characteristics. 5
7. Set according to claim 1, **characterised in that** said shell consists of a substantially parallelepiped hollow body that is open at the bottom which is slotted from above onto the platform, and is removably fixed here through threaded members. 10
8. Set according to claim 7, **characterised in that** said hollow body is equipped with at least one upper handle for lifting and manoeuvring. 15
9. Set according to claim 7, **characterised in that** said hollow body is equipped with hatches and removable panels intended for access to specific parts of the generator set and/or inner areas of the respective shell. 20
10. Set according to claim 1, **characterised in that** the platform is equipped with a space that is accessible from the outside where the fuel tank for said internal combustion engine is removably received. 25

30

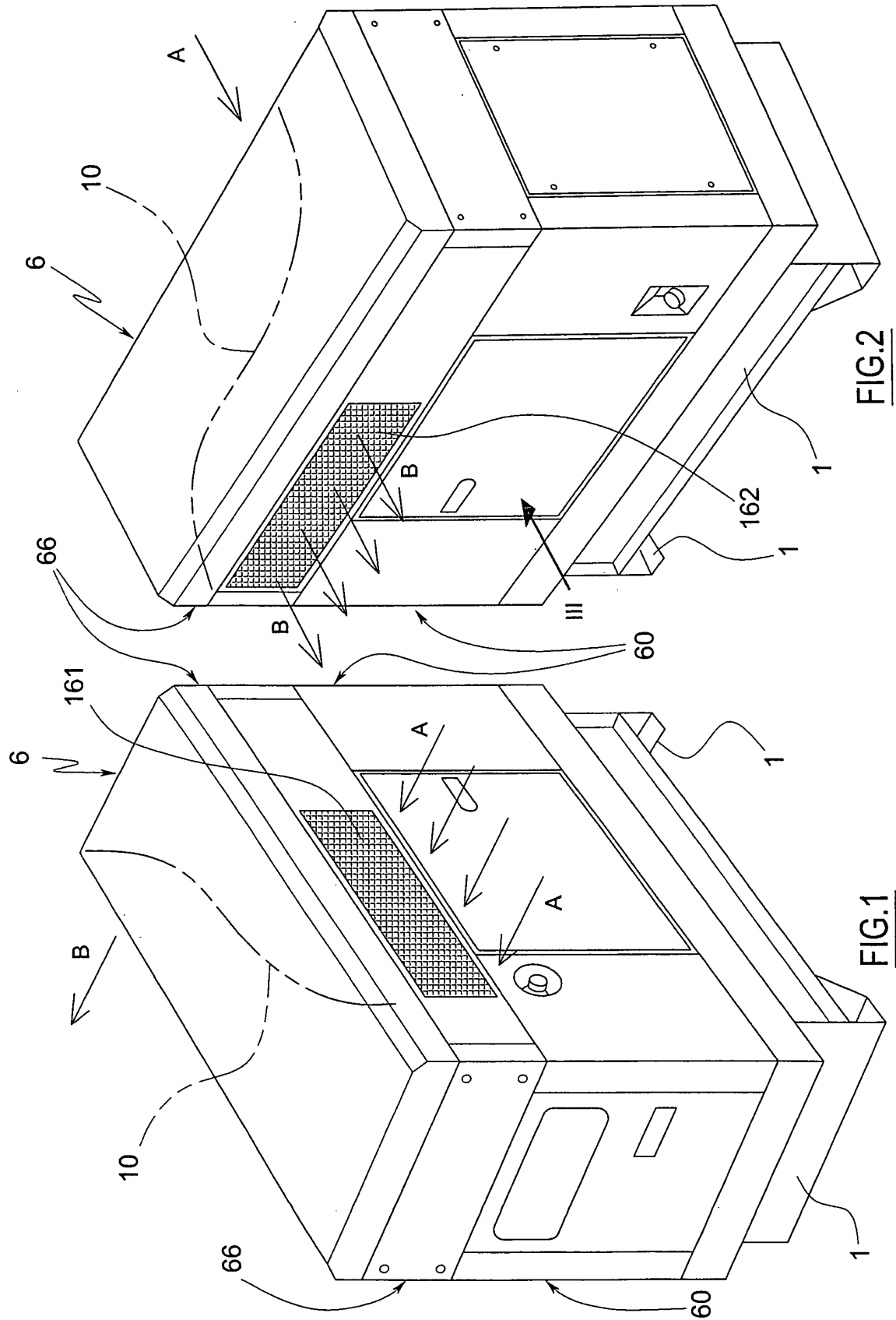
35

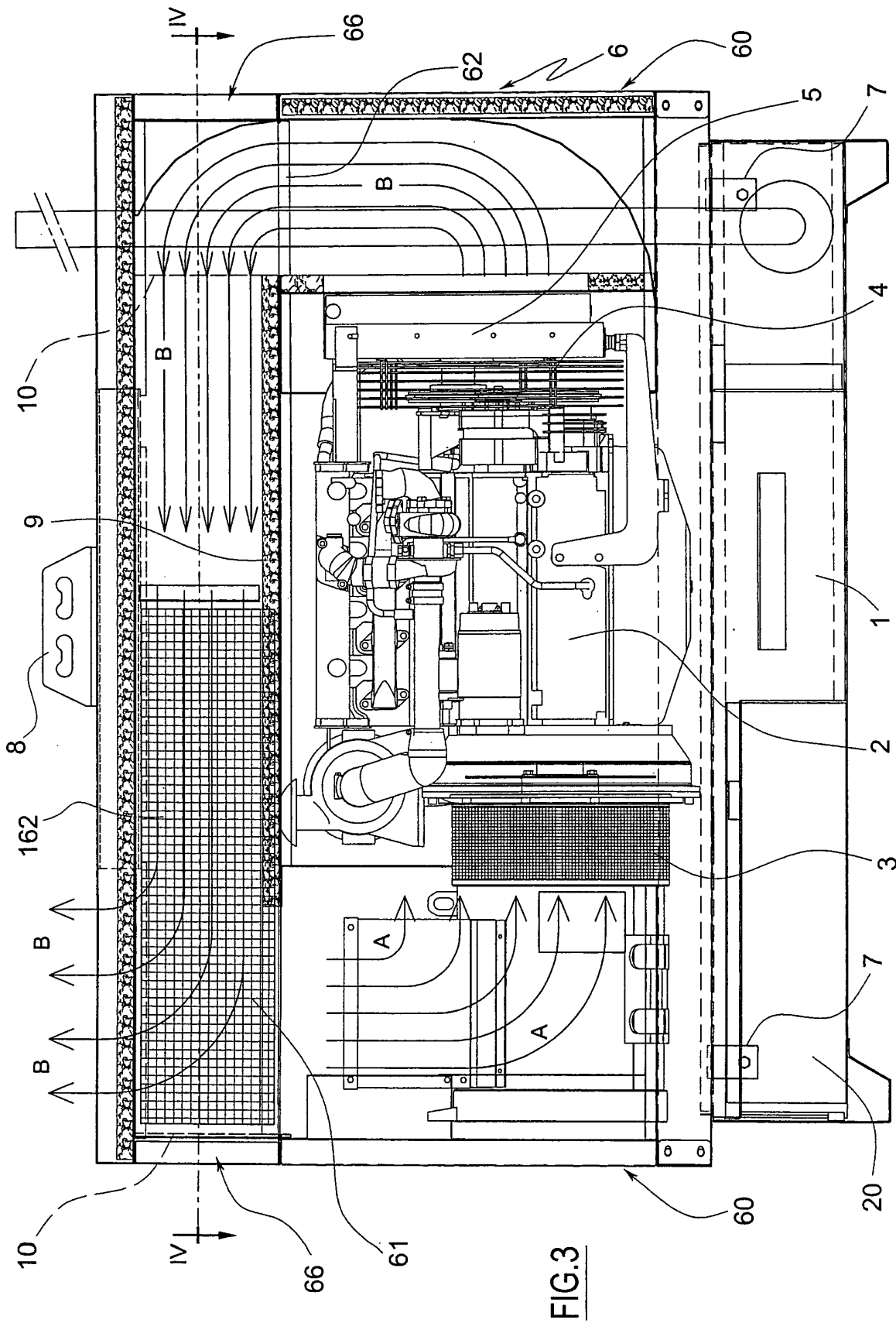
40

45

50

55





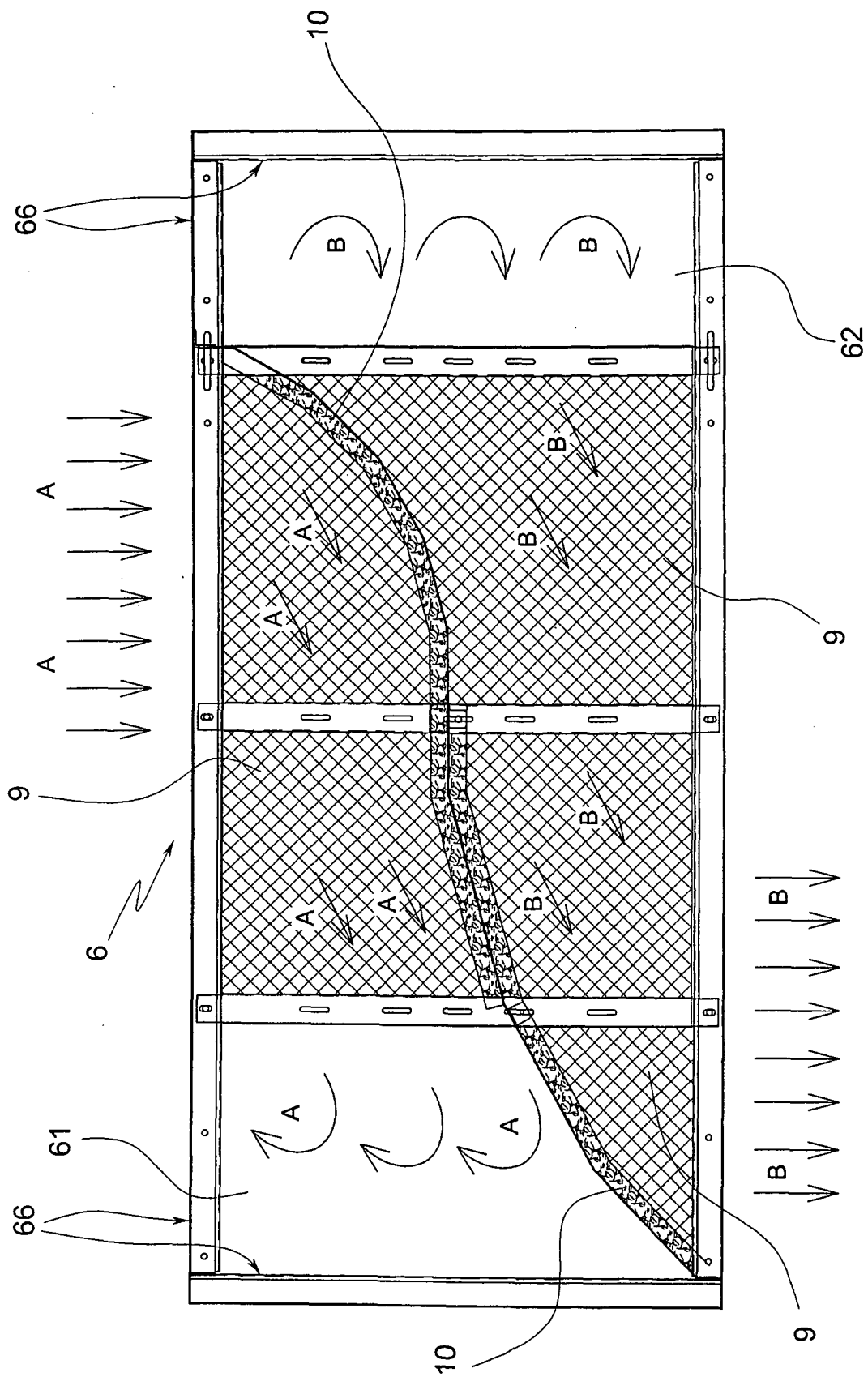


FIG. 4



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 05 07 6370

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 11, 3 January 2001 (2001-01-03) & JP 2000 213369 A (MEIDENSHA CORP), 2 August 2000 (2000-08-02) * abstract; figure 1 *	1-6,9	F02B63/04 F02B77/13
Y	-----	7,8	
Y	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 02, 5 February 2003 (2003-02-05) & JP 2002 295265 A (FUJI HEAVY IND LTD), 9 October 2002 (2002-10-09) * abstract; figures 6,8,9 *	7,8	
A	-----	1	
A	EP 1 296 039 A (HONDA GIKEN KOGYO KABUSHIKI KAISHA) 26 March 2003 (2003-03-26) * paragraphs [0031] - [0033]; figure 4 *		
A	-----	1,10	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 07, 3 July 2003 (2003-07-03) & JP 2003 090223 A (YANMAR CO LTD), 28 March 2003 (2003-03-28) * abstract; figures 2,6,18-20 *		F02B
A	-----	10	
A	US 2003/184094 A1 (SODEMANN WESLEY C ET AL) 2 October 2003 (2003-10-02) * abstract *		
-----			
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 October 2005	Examiner Tietje, K
CATEGORY OF CITED DOCUMENTS		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	
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			

1  
EPO FORM 1503 03.82 (P04C01)



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 07 6370

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  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-10-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2000213369	A	02-08-2000	NONE	
JP 2002295265	A	09-10-2002	NONE	
EP 1296039	A	26-03-2003	CN 1410662 A	16-04-2003
			DE 60200995 D1	23-09-2004
			DE 60200995 T2	05-01-2005
			JP 2003097284 A	03-04-2003
			US 2003075926 A1	24-04-2003
JP 2003090223	A	28-03-2003	NONE	
US 2003184094	A1	02-10-2003	NONE	