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(54) **Module of a terminal of an air-conditioning system for premises**

(57) The invention concerns a module (100) of a terminal (2) of an air-conditioning system for premises, equipped with a head (1) having a structure (10) removably associated with the module (100). The structure (10) comprises two side walls (14, 15), a rear wall (12) and a top wall (13), a first aperture (20) for the air entry, a second aperture (21) for the air outlet, and a deflector element (11) for intercepting the flow of air emerging from the second aperture (21). The deflector element (11) extends in a predominant longitudinal direction (X-X) be-

tween the two side walls (14, 15). In addition, the structure (10) comprises a guide means (50) for supporting and guiding the displacement of the deflector element (11) between an open position and a closed position in which the deflector element (11) substantially closes the second aperture (21), and a drive means (30) operationally associated with the head (1) by means of a kinematic transmission means (70) for actuating the deflector element (11) between the open position and the closed position with respect to the structure (10).

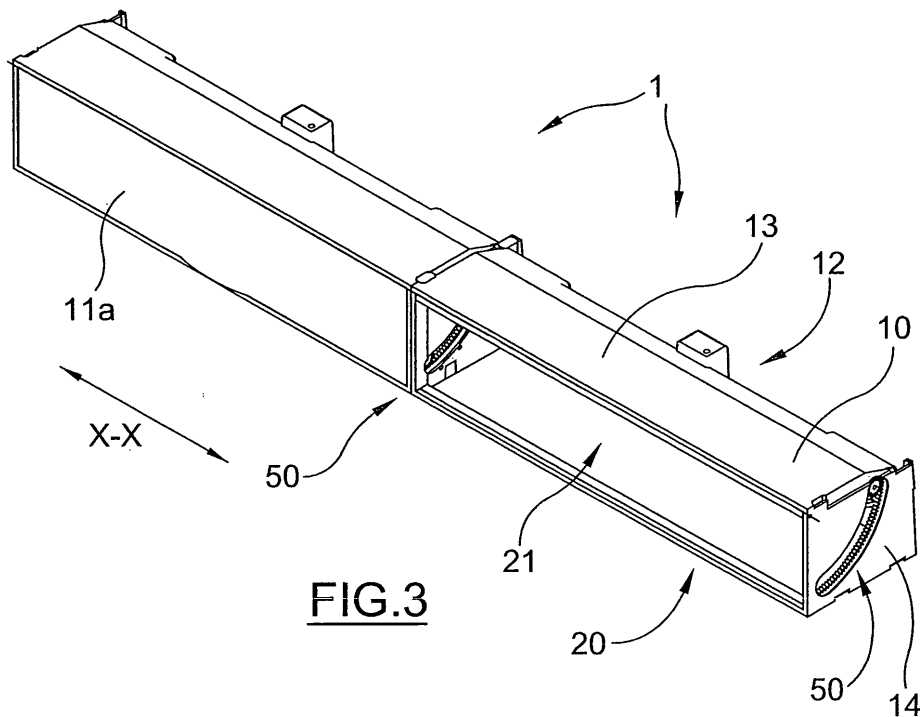


FIG.3

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Description

[0001] The present invention relates to a module of a terminal of an air-conditioning system for premises according to the preamble of Claim 1.

[0002] Said modules are known in the technology of this field and are commonly used for defining with maximum accuracy the space in which the terminal is to be received.

[0003] An example of a module is described in Italian Patent application MI2005A002363 in the name of the Applicant.

[0004] According to the prior art mentioned above, the module comprises a structure insertable into a space provided in a wall and having a seating suitable for receiving a terminal of an air-conditioning system, for example a radiant element or a heat exchanger.

[0005] The structure insertable into the space is equipped with a closure panel removably fixable to the structure and intended to close the seating partially.

[0006] In order to ensure correct circulation of the air, the module is equipped with an air entry aperture, an air outlet aperture and an orientable deflector element which intercepts the flow of air emerging from the outlet aperture. The deflector element is moreover orientable in a plurality of angular positions between an open position and a closed position.

[0007] The module is equipped with an electric motor for actuating the orientable deflector element and with an electrical power source for supplying the electric motor. The orientable deflector element, the electric motor and the electrical power source are supported by the closure panel.

[0008] The module described above, however, has a series of drawbacks. For example, in the event that maintenance operations need to be carried out on the components of the module, it is necessary to disassemble the module itself by removing the closure panel, with consequent waste of time, and operating difficulties.

[0009] Moreover, such a module does not allow any possible replacements of components in a simple and rapid manner, with consequent increases in costs.

[0010] It is therefore an aim of the present invention to remedy the drawbacks indicated above by proposing a module which will have characteristics such as to speed up the maintenance operations and is at the same time directed towards greater versatility in the replacement of components.

[0011] According to the present invention, this aim is achieved by a module having the characteristics of Claim 1.

[0012] The characteristics and advantages of the module according to the present invention will become clear from the following description of a preferred exemplary embodiment thereof, provided by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1 shows a perspective view of a module ac-

ording to the present invention,

- Figure 2 shows a perspective view of the module of Figure 1 with the deflector elements of the head in the open position,
- 5 - Figure 3 shows a perspective view of a pair of heads according to the present invention,
- Figure 4 shows a side view of one of the heads of Figure 3 in which a guide means can be seen,
- 10 - Figure 5 shows a further side view of one of the heads of Figure 3 in which a guide means can be seen.

[0013] With reference to the aforesaid drawings, the reference 100 indicates as a whole a module of a terminal (not shown) of an air-conditioning system for premises, for example a radiant element or plate or a heat exchanger.

[0014] The module 100 comprises a body 110 insertable in a space in a wall, a seating 111 and a closure panel 112. The space is formed in the wall more or less roughly by a building worker by removing a portion of material from the wall or by constructing the wall around it.

[0015] The insertable body 110 has the shape of a box or formwork and may be made of sheet metal or plastics material or of wood and is suitable for receiving the terminal of an air-conditioning system within it.

[0016] As can be seen in Figure 2, the module 100 has a first aperture 120 for the air entry and a second aperture 121 for the air outlet.

[0017] Advantageously, in the module 100 of the present invention it is possible to provide at least one head 1 equipped with a structure 10 removably associated with the module 100. The seating 111 of the module 100 is suitable for receiving one or more heads 1 in positive connection. In this way it is possible to permit the complete replacement of the head 1 according to requirements, in order to simplify, speed up and optimise the installation operations and/or any maintenance operations on the module 100.

[0018] As can be seen in Figure 3, the structure 10 comprises two side walls 14 and 15, a rear wall 12 and a top wall, 13.

[0019] In order to regulate the flow of conditioned air from the terminal, the structure 10 has a first aperture 20 for the air entry, a second aperture 21 for the air outlet and a deflector element 11 for intercepting the flow of air emerging from the second aperture 21. In particular, the deflector element 11 extends in a predominant longitudinal direction X-X between the two side walls 14 and 15.

[0020] In the example shown in Figure 3, the second aperture 21 for the air outlet is positioned at the front of the head 1.

[0021] It should be pointed out that, once the head 1 is coupled to the module 100, the second aperture 121 of the module 100 for the air outlet is associated with the first aperture 20 of the head 1 for the air entry in such a way as to obtain a circulation of air entering by the first aperture 120 of the module 100 and emerging directly from the second aperture 21 of the head 1.

[0022] The head 1 comprises a guide means 50 associated with the structure 10 for supporting and guiding the displacement of the deflector element 11 between an open position and a closed position in which the deflector element 11 substantially closes the second aperture 21.

[0023] Operationally associated with the head 1 is a drive means 30 which, by means of a kinematic transmission means 70, is capable of actuating the deflector element 11 between the open position and the closed position with respect to the structure 10.

[0024] In one embodiment, the drive means 30 is associated with the deflector element 11. In particular, the deflector element 11 comprises a front side 11a facing towards the outside of the head 1 when the deflector element 11 is in the closed position, and an opposed rear side 11b.

[0025] In the example shown in figure 4, the drive means 30 is associated with the rear side 11b of the deflector element 11 and is equipped with a rotation shaft 31.

[0026] In more detail, the kinematic transmission means 70 comprises an assembly consisting of a pinion 32 and a rack 53.

[0027] Advantageously, the pinion 32 is connected in a rotationally secure manner to the rotation shaft 31 of the drive means 30, and the rack 53 is integral with the structure 10. In this way, when the drive means 30 transmits the motion to the pinion 32 this latter, since it is associated with the rack 53, allows the deflector element 11 to position itself in a plurality of positions between the open position, in which the deflector element 11 allows the air flow to emerge from the second aperture 21, and the closed position, in which the deflector element 11 interrupts the air flow emerging from the first aperture 20.

[0028] It should be noted that, by means of the module 100 of the present invention, in which the deflector element 11 can be positioned in a plurality of extremely precise positions, absolutely reliable and comfortable air-conditioning is ensured in the premises without the need for manual intervention for adjustment of the air-conditioning by a user.

[0029] As can be seen in the appended drawings, the guide means 50 is associated with the side wall 14 or 15.

[0030] The guide means 50 comprises a slot 51 in the inner surface 52 of which is associated the rack 53 suitable for engaging with the pinion 32 for the actuation of the deflector element 11.

[0031] Alternatively, the rack 53 may be associated with both the side walls 14 and 15, such that the head 1 can be equipped with a plurality of drive means 30 for obtaining even finer positioning of the deflector element 11.

[0032] The module 100 comprises a connecting means 80 suitable for connecting the drive means 30 to the mains network for the power supply.

[0033] Advantageously, the head 1 comprises a supply means 40 for supplying the drive means 30, such as, for example, typical batteries.

[0034] In one embodiment, the supply means 40 is mounted on board the head 1.

[0035] In an alternative embodiment, the supply means 40 is mounted on board the deflector element 11.

[0036] As illustrated in Figure 5, the deflector element 11 is equipped with an engagement means 60 coupled to the guide means 50. In particular, the engagement means 60 is equipped with sliding means 61 suitable for advancing in the guide means 60 during the movement of the deflector element 11 into the plurality of positions from the open position to the closed position and/or vice versa.

[0037] For example, the deflector element 11 may comprise at a first of its lateral ends a kinematic transmission means 70, and at a second of its ends, opposed to the first end, an engagement means 60 such as to ensure that the deflector element 11 has effective stability during the movement.

[0038] According to one embodiment, the module 100 is equipped with an acquisition means 200 for acquiring the temperature of the premises and suitable for transforming the measured temperature value t_0 into an electrical signal $e(t_0)$ proportional to the measured temperature value t_0 .

[0039] In signal communication with the acquisition means 200, in the module 100 a control means 210 is provided which is suitable for comparing the measured temperature value t_0 with a predetermined temperature value t_1 . The predetermined temperature value t_1 is the value desired by the user and set for example on a common thermostat.

[0040] The module 100 moreover comprises a regulating means 220 in signal communication with the control means 210. The regulating means 220 is thus capable of sending a regulating signal to the drive means 30 for defining the orientation of the deflector element 11 on the basis of the comparison between the measured temperature value t_0 and the predetermined temperature value t_1 .

[0041] In order to regulate the temperature value desired by the user, the regulating means 220 is suitable for obtaining the predetermined and desired temperature value t_1 in the premises.

[0042] Advantageously, it is possible to provide for the acquisition means 200, the control means 210 and the regulating means 220 all to be housed in the head 1.

[0043] In this way it is thus possible to obtain a head 1 completely free of electrical connections with the module 100 which houses it, resulting in extremely advanced operation even in the event of a lack of supply from the electrical mains.

[0044] Moreover, interventions by the specialised personnel may thus be even easier. It may even be possible, in the event of "off site" repairs, to completely replace the head 1 which is to be repaired with another, issued by the maintenance body, in order thus to avoid interruptions in operation for the entire period during which the user's head will be undergoing repair.

[0045] In order to satisfy contingent and specific requirements, a person skilled in the art may apply to the above-described module and head according to the invention many modifications and variants, all, however, included within the scope of protection of the invention as defined by the appended claims.

Claims

1. A module (100) of a terminal (2) of an air-conditioning system for premises, **characterized in that it comprises**

- a head (1) having a structure (10) removably associated with said module (100), said structure (10) comprising:

- two side walls (14, 15), a rear wall (12) and a top wall (13),
- a first aperture (20) for the air entry,
- a second aperture (21) for the air outlet,
- a deflector element (11) for intercepting the flow of air emerging from said second aperture (21), said deflector element (11) extending in a predominant longitudinal direction (X-X) between said two side walls (14, 15),
- a guide means (50) associated with said structure (10) for supporting and guiding the displacement of said deflector element (11) between an open position and a closed position in which said deflector element (11) substantially closes said second aperture (21),
- a drive means (30) operationally associated with said head (1) by means of a kinematic transmission means (70) for actuating said deflector element (11) between said open position and said closed position with respect to said structure (10).

2. A module (100) according to claim 1, wherein said drive means (30) is associated with said deflector element (11).

3. A module (100) according to claim 1 or claim 2, wherein:

- said deflector element (11) comprises a front side (11a) facing towards the outside of said head (1) when said deflector element (11) is in said closed position, and an opposed rear side (11b), and wherein
- said drive means (30) is associated with said rear side (11b) of said deflector element (11).

4. A module (100) according to any one of claims 1 to

3, wherein said kinematic transmission means (70) comprises an assembly consisting of a pinion (32) and a rack (53).

5. A module (100) according to claim 4 or claim 5, wherein said pinion (32) is connected in a rotationally secure manner to the rotation shaft (31) of said drive means (30) and said rack (53) is integral with said structure (10).

6. A module (100) according to claim 5, wherein said guide means (50) is associated with said at least one side wall (14, 15), said guide means (50) comprising a slot (51) in the inner surface (52) of which is associated said rack (53) suitable for engaging with said pinion (32) for the actuation of said deflector element (11) in said plurality of positions between the open position and the closed position.

7. A module (100) according to any one of claims 1 to 6, comprising a connecting means (80) suitable for connecting said drive means (30) to the mains network for the power supply.

8. A module (100) according to any one of claims 1 to 6, wherein said head (1) comprises a supply means (40) for supplying said drive means (30).

9. A module (100) according to claim 8, wherein said supply means (40) is mounted on board said deflector element (11).

10. A module (100) according to any one of claims 1 to 9, wherein said deflector element (11) comprises an engagement means (60) coupled to said guide means (50), said engagement means (60) comprising a sliding means (61) suitable for advancing in the guide means (50) during the movement of said deflector element (11) in said plurality of positions between the open position and the closed position.

11. A module (100) according to any one of claims 1 to 10, comprising:

- an acquisition means (200) for acquiring the temperature of said premises, and suitable for transforming the measured temperature value (t0) into an electrical signal (e(t0)) proportional to said measured temperature value (t0),
- a control means (210) in signal communication with said acquisition means (200) and suitable for comparing the value of said measured temperature (t0) with a predetermined temperature value (t1),
- a regulating means (220) in signal communication with said control means (210) and suitable for sending a regulating signal to said drive means (30) for defining the orientation of said

deflector element (11) on the basis of the comparison between said measured temperature value (t0) and said predetermined temperature value (t1), said regulating means (220) being suitable for obtaining said predetermined temperature value (t1) in said premises. 5

12. A head (1) having a structure (10) comprising:

- two side walls (14, 15), a rear wall (12) and a top wall (13), 10
- a first aperture (20) for the air entry,
- a second aperture (21) for the air outlet,
- a deflector element (11) for intercepting the flow of air emerging from said second aperture (21), said deflector element (11) extending in a predominant longitudinal direction (X-X) between said two side walls (14, 15), 15
- a guide means (50) associated with said structure (10) for supporting and guiding the displacement of said deflector element (11) between an open position and a closed position in which said deflector element substantially closes said second aperture (21), 20
- a drive means (30) operationally associated with said head (1) by means of a kinematic transmission means (70) for actuating said deflector element (11) between said open position and said closed position with respect to said structure (10), 25 30

characterized in that said head (1) can be associated with a module (100) according to any one of claims 1 to 11. 35

13. A head (1) according to claim 12, wherein said acquisition means (200), said control means (210) and said regulating means (220) are housed in said structure 10. 40

14. A head (10) according to claim 8 or claim 9, wherein said supply means (40) comprises at least one battery (41). 45

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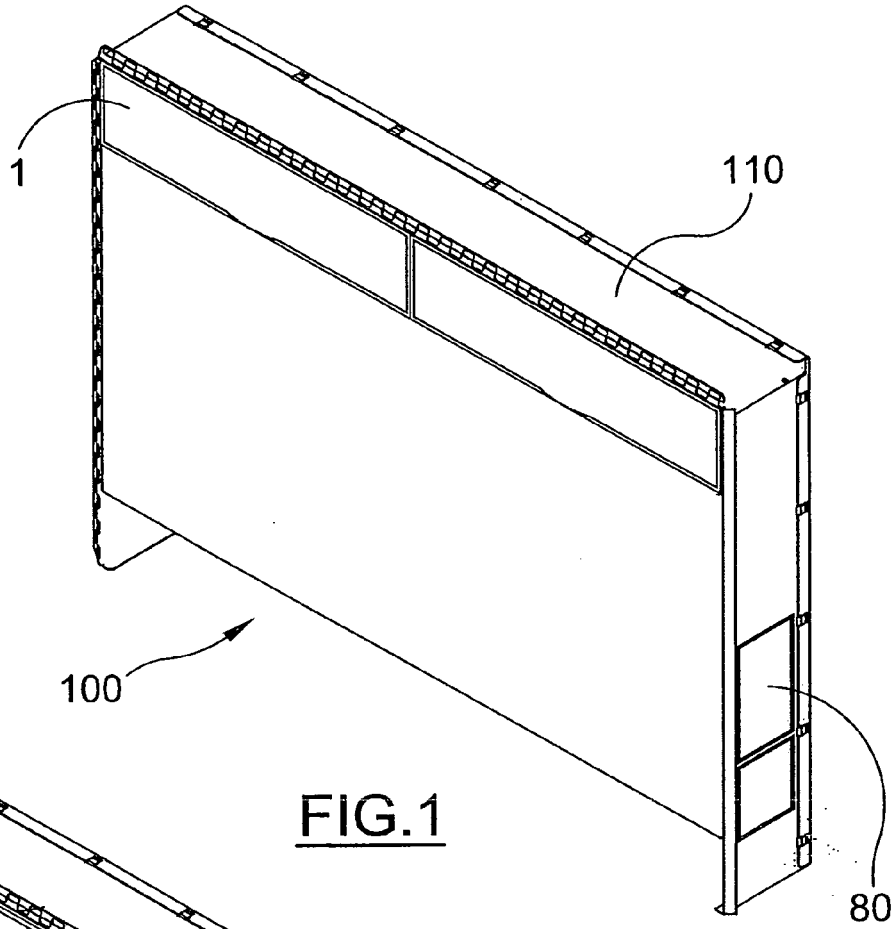


FIG. 1

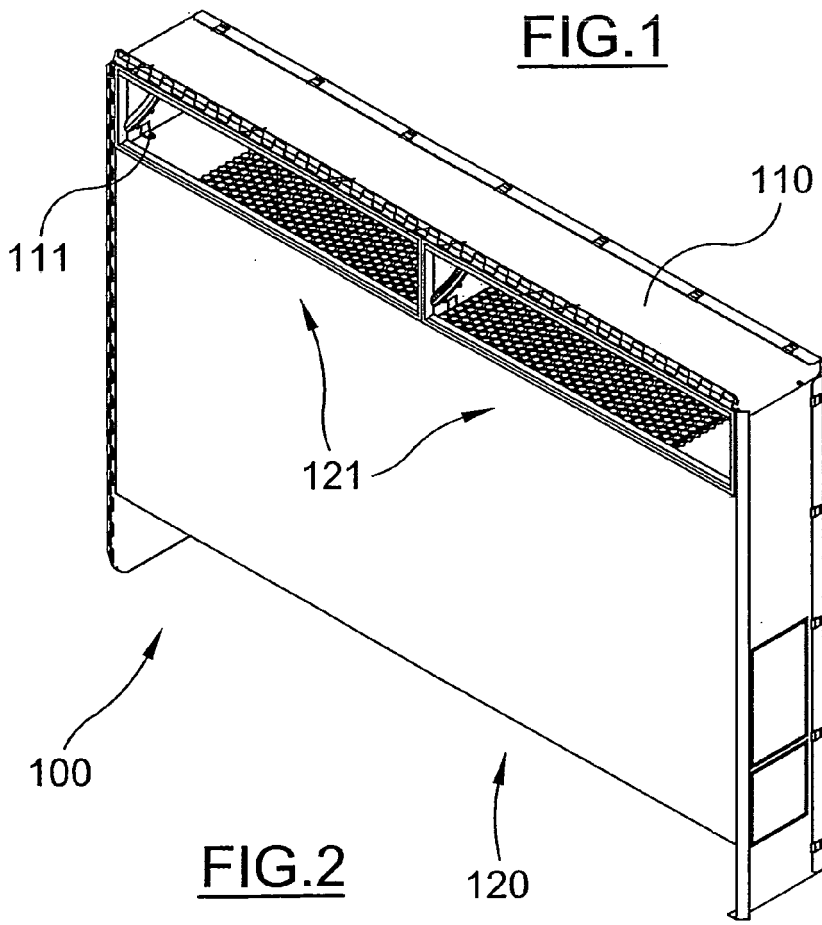
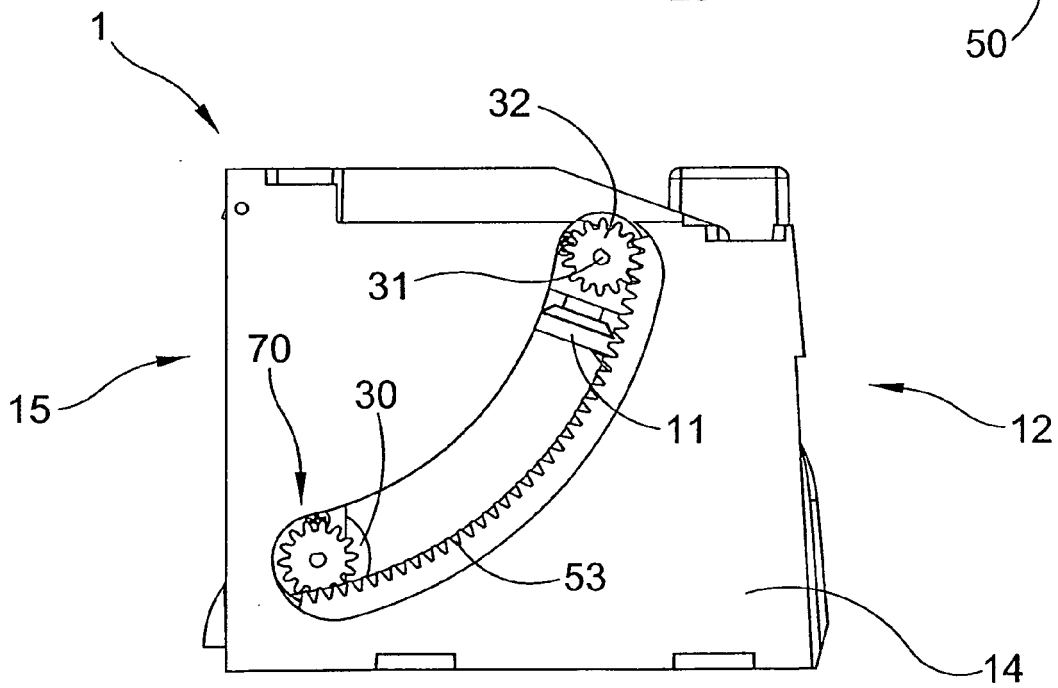
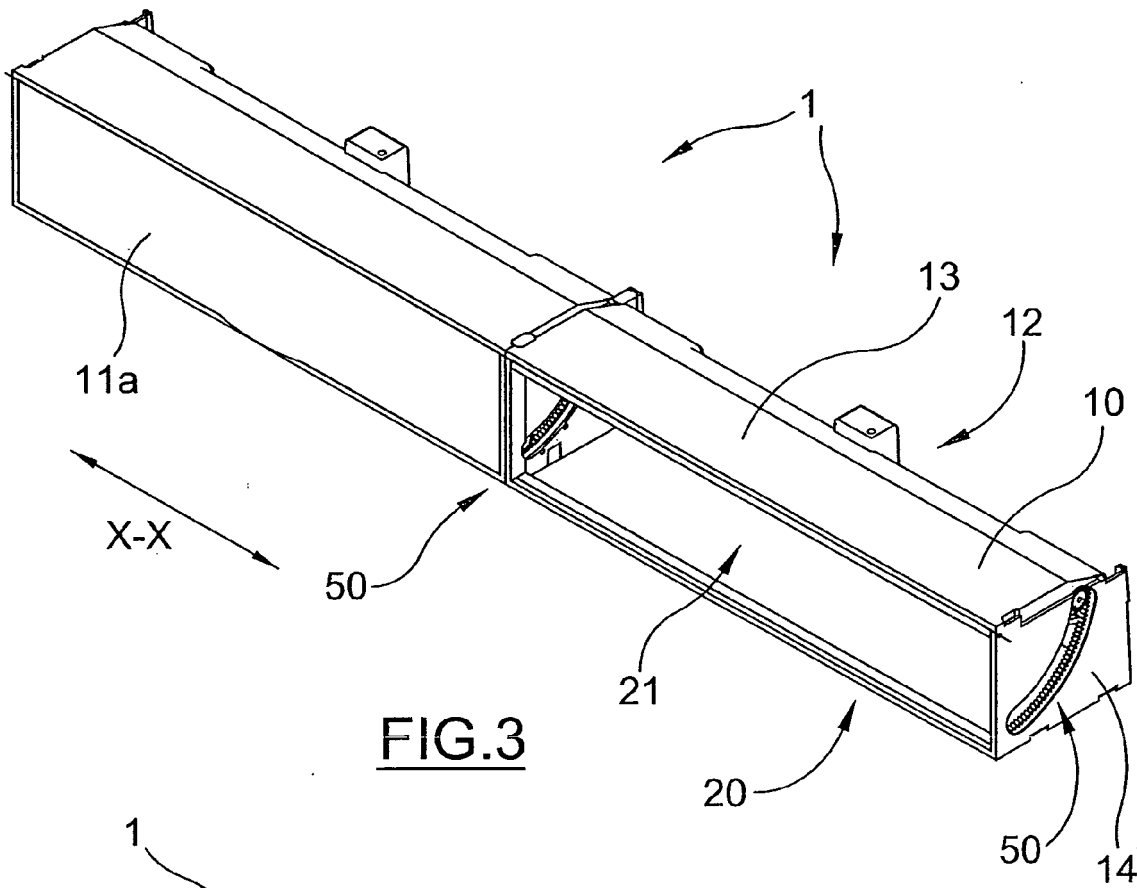


FIG. 2



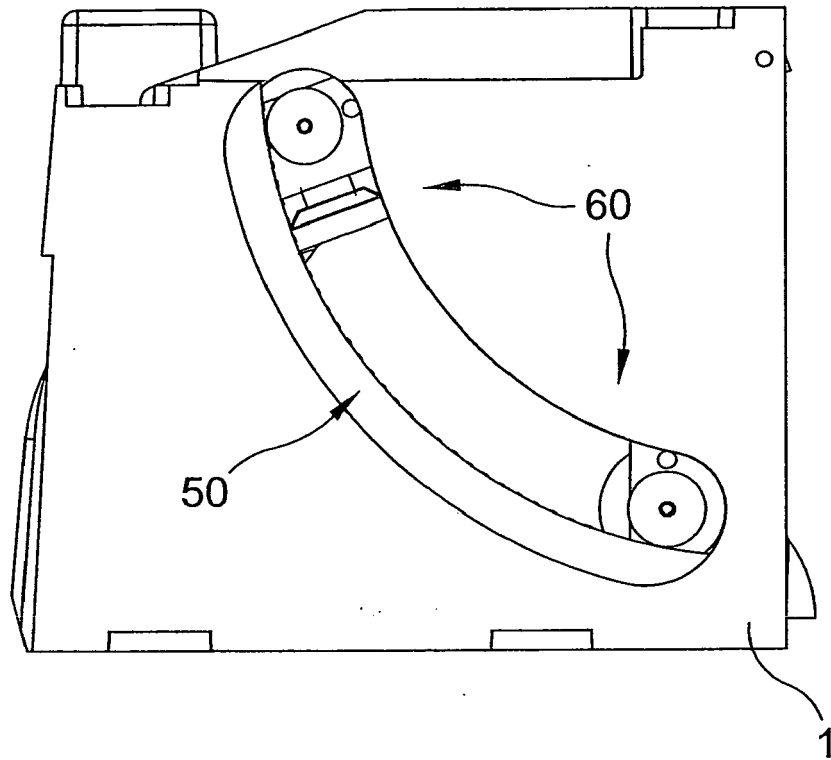


FIG.5



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 99/67577 A (SPRINGER CARRIER SA [BR]; CARRIER CORP [US]; CORREA JUAN CARLOS CARNE) 29 December 1999 (1999-12-29) * page 3, line 25 - page 8, line 15; figures 3,6-8 *	1-14	INV. F24F1/00 F24F11/00 F24D19/06
X	WO 2004/092671 A (RIELLO INTERNAT GROUP S P A [IT]; RIELLO VALERIO GIORDANO [IT]) 28 October 2004 (2004-10-28) * the whole document *	1,12	
A	EP 0 837 288 A (RIELLO CONDIZIONATORI SAS [IT] AERMEC S P A [IT]) 22 April 1998 (1998-04-22) * the whole document *	1,11	
A	WO 2004/003451 A (RIELLO CONDIZIONATORI GRUPPO G [IT]; RIELLO VALERIO GIORDANO [IT]) 8 January 2004 (2004-01-08) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24F F24D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 July 2008	Examiner González-Granda, C
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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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 08 42 5124

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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17-07-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9967577	A	29-12-1999	AU 7901098 A	10-01-2000
			US 6210269 B1	03-04-2001

WO 2004092671	A	28-10-2004	AU 2003233181 A1	04-11-2004

EP 0837288	A	22-04-1998	AT 221636 T	15-08-2002
			CA 2218430 A1	15-04-1998
			CN 1179527 A	22-04-1998
			DE 69622718 D1	05-09-2002
			DE 69622718 T2	06-02-2003
			DK 837288 T3	09-09-2002
			ES 2179926 T3	01-02-2003
			PT 837288 T	31-12-2002
			SI 837288 T1	31-10-2002
			TR 9701180 A2	21-05-1998
			US 6120372 A	19-09-2000

WO 2004003451	A	08-01-2004	AU 2002317497 A1	19-01-2004
			CA 2486791 A1	08-01-2004
			CN 1630801 A	22-06-2005
			EP 1518082 A1	30-03-2005
			HU 0500362 A2	28-07-2005
			SK 50312004 A3	01-04-2005

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT MI20052363 A [0003]