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(54) **Device for pressurising a pneumatically supported self-supporting structure in particular a field tent**

(57) A device (1) for pressurising a pneumatically supported self-supporting structure (2), in particular a field tent, comprises an autonomous unit (3) equipped with mechanical ventilation means (6; 7), also being equipped with an air intake section (4) and a pressurised air delivery section (5) which can be connected to the

self-supporting structure (2). The unit (3) is also equipped with battery means (12) for accumulating electricity, operatively connected to the mechanical ventilation means; and electric recharging means (13), designed to connect at least the battery means (12) to an external electricity supply when one is available.

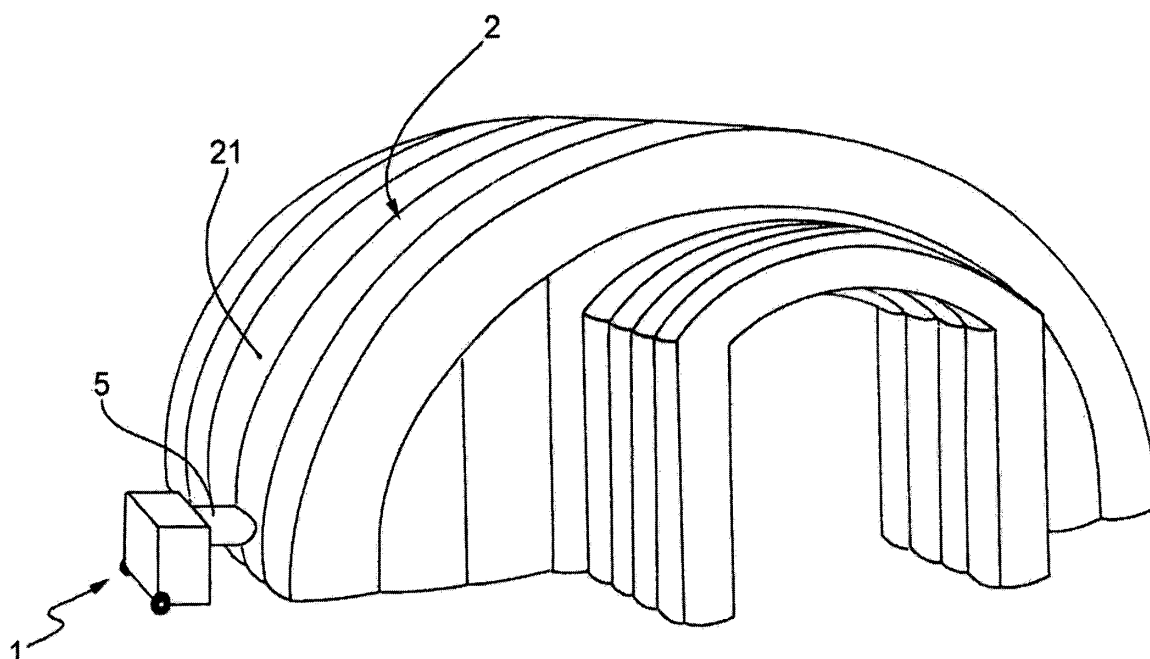


FIG.1

Description

[0001] The present invention relates to the sector of pneumatically supported self supporting equipment and in particular relates to a device for inflating field tents, mainly designed for civil defence activities.

[0002] Specific reference is made to the civil defence sector in the description which follows of an example embodiment of the invention. However, it shall be understood to be used by way of example only and without in any way limiting the scope of the invention, since the present invention may just as advantageously be applied in other technical sectors different to that specifically indicated.

[0003] In the sector of first aid and emergency activities the use of pneumatic self-supporting tents is well known. Said tents support themselves by means of the introduction of pressurised air into the tent internal space.

[0004] The means for pressurising the air consist of conventional fan devices, powered with electricity supplied by a fixed supply network or by a local generator.

[0005] Setting up such a tent therefore involves connecting it to the fan unit and gradually pressurising the internal environment of the tent which, subjected to an inflating action, gradually rises up until it adopts its definitive operating configuration.

[0006] Once the tent has been suitably pressurised, the fan unit automatically adjusts its number of revolutions so as to compensate for a drop in internal pressure which may occur for the most diverse reasons, including for example air leaks through transit openings in the tent and/or through seams connecting the various sections of the tent surface.

[0007] In first aid and emergency situations - for example when faced with particularly intense and serious natural events such as earthquakes, floods, etc. - it may be the case that the first aid support field must be set up in the absence of electricity. Said absence is due to the fact that the fixed electricity network is unavailable locally or, even if present, is temporarily not working.

[0008] In such cases, the speed at which action is taken may be fundamental in resolving critical situations. However, if a generator is not immediately available, putting up the tent is not possible and certain first aid and/or sheltering activities which could be performed inside it may be subject to more or less long delays, which could on some occasions have serious consequences.

[0009] Moreover, it is not always possible to make use of the generator with the continuity needed to ensure that once it is erected the tent can from time to time be pressurised to compensate for drops in pressure.

[0010] For these reasons, in all of the cases in which structure internal pressurisation is not fully guaranteed, it is common practice to assemble a supporting structure inside the space in the tent. The supporting structure is designed to prevent the tent from sagging and rendering the area inside unusable.

[0011] However, in such a case even assembly of the

supporting structure involves further disadvantages. Said assembly operation may contribute to delaying the start of first aid activities linked to tent operability. Moreover, it also involves having to transport to the site accessory equipment which in emergency situations one could really do without, since in its place one could more usefully transport items more strictly necessary and intended for actual civil defence and/or for rapid aid operations.

[0012] Therefore, the main aim of the present invention is to overcome said disadvantages with a pressurising device which allows: extremely rapid tent set up, irrespective of the presence or absence of a local electricity supply, and without using a safety structure designed to prevent sagging.

[0013] The invention also has for an aim to also allow tent rapid depressurisation, which may be particularly advantageous for speeding up tent disassembly, allowing a rapid reaction to an unforeseen emergency, or for more rapidly moving camp from one site to another.

[0014] Another aim of the invention is to provide a compact, easily manoeuvrable autonomous device.

[0015] In accordance with said aims, the invention relates to a device for pressurising pneumatically supported self-supporting structures whose technical features are described in claim 1 and/or any of the claims from 2 to 9 which are directly or indirectly coordinated with it.

[0016] The advantages of the invention are more apparent from the detailed description of a preferred, non-limiting embodiment of the invention, with reference to the accompanying drawings, in which:

- Figure 1 is a perspective assembly view of a pneumatic tent connected to a pressurising device in accordance with the invention;
- Figure 2 is a side view of the pressurising device;
- Figure 3 is a view of the device of Figure 2 seen according to the orientation and direction indicated by the arrow A;
- Figure 4 is an elevation view with some parts cut away to better illustrate others of the pressurising device.

[0017] With reference to the accompanying drawings, in Figure 1 the numeral 1 denotes a device for pressurising a pneumatically supported self-supporting structure 2, in particular a field tent.

[0018] Figures 2 and 3 provide better views of the device 1 which basically comprises an autonomous unit 3 having a casing 8, mounted on wheels 10 and equipped with a handle 11 for moving it.

[0019] The casing 8 houses mechanical ventilation means 6 and 7, connected to an air intake section 4 and a pressurised air delivery section 5, made in a wall 9 of the lateral surface of the casing 8.

[0020] As shown in Figure 4, the autonomous unit 3 also houses in the casing 8 battery means 12 for accumulating electricity, operatively connected to the me-

chanical ventilation means 6 and 7. It also contains electric recharging means 13, designed to connect the battery means 12 to an external electricity supply, when available, for recharging the battery means 12.

[0021] More particularly, the mechanical ventilation means preferably comprise two centrifugal fans 6 and 7, driven by direct current motors with two operating speeds at 12/24 Volts. The centrifugal fans 6 and 7 are operatively connected to the air intake section 4 and pressurised air delivery section 5.

[0022] The two fans 6 and 7 are preferably abutted to a pressurised air delivery section 5 and an air intake section 4.

[0023] For device 1 use for pressurising the pneumatic structure 2, the intake section 4 takes air directly from the environment immediately surrounding the unit 3, whilst in contrast the delivery section 5 is connected to a mating inflation opening made in an outer wall 21 of the self-supporting structure 2, so that subsequent activation of the fans 6 and 7, controlled using suitable selector means 14 connected to the wall 8 of the unit 3, allows gradual pressurisation of the self-supporting structure 2.

[0024] The presence of two fans 6 and 7, which may be controlled to operate either individually and sequentially with each other, or simultaneously and in parallel, allows various advantages.

[0025] The possibility of activating one fan 6 and 7 at a time means that, should a fault occur in one fan, the other can immediately be activated, without interrupting the service, and/or without having to provide safety structures to prevent sagging of the pneumatic self-supporting structure 2.

[0026] In contrast, simultaneous use of the two fans 6 and 7 makes inflation quite rapid, which is particularly advantageous when operating in adverse weather conditions and/or if the pneumatic structure 2 is set up in high winds.

[0027] The unit 3 also allows inversion of the fluid dynamic connections of the fans 6 and 7 with the intake section 4 and the delivery section 5. This means that the fans 6 and 7 can suck air out of the pneumatic structure 2 internal compartment and expel the air towards the surrounding outside environment.

[0028] Therefore, the fans 6 and 7 can also be used to rapidly deflate the pneumatic structure 2, for example when rapid dismantling of the structure 2 is required.

[0029] The electric recharging means 3 may be of the type designed to operate with current intensity of approximately 10 A. When an external electricity supply is available, said means may reserve part of the current intensity (5A) for powering the fan motors and part (5A) for recharging the battery means 12.

[0030] The battery means may be for example sealed, maintenance-free batteries which, with limited weight, allow the device 1 to operate, in the absence of an external electricity supply, with an autonomy of around 8 to 10 hours.

[0031] The device 1 according to the invention has proved able to fulfil the aims and to operate efficiently and rapidly, allowing structure 2 inflation times of around 5 to 10 minutes, whilst deflation mechanically assisted by the fans 6 and 7 may be performed in around 12 to 15 minutes.

[0032] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all details of the invention may be substituted by technically equivalent elements.

15 Claims

1. A device for pressurising a pneumatically supported self-supporting structure (2), in particular a field tent, **characterised in that** it comprises an autonomous unit (3) equipped with mechanical ventilation means (6; 7), having an air intake section (4) and a pressurised air delivery section (5) which can be connected to the self-supporting structure (2); battery means (12) for accumulating electricity, operatively connected to the mechanical ventilation means; and electric recharging means (13), designed to connect at least the battery means (12) to an external electricity supply.
2. The device according to claim 1, **characterised in that** the mechanical ventilation means comprise at least one centrifugal fan (6), operatively connected to the intake section (4) and the delivery section (5).
3. The device according to claim 1, **characterised in that** the mechanical ventilation means comprise two centrifugal fans (6, 7), operatively connected to the intake section (4) and the delivery section (5); the device (1) comprising selector means (14), for controlling sequential or simultaneous activation of the centrifugal fans (6, 7).
4. The device according to claim 3, **characterised in that** the fans (6, 7) are abutted at least to a pressurised air delivery section (5).
5. The device according to claim 3, **characterised in that** the fans (6, 7) are abutted at least to an air intake section (4).
6. The device according to claim 1, **characterised in that** the delivery section (5) is designed to connect to a mating inflation opening made in the self supporting structure (2).
7. The device according to claim 6, **characterised in that** the intake section (4) can be inverted with the delivery section (5), allowing self-supporting struc-

ture (2) deflation mechanically assisted by the fans (6, 7),

8. The device according to claim 1, **characterised in that** the portable unit (3) comprises a casing (8) housing together the mechanical ventilation means (6; 7), the battery means (12) for accumulating electricity and the recharging means (13), the casing (8) supporting, on its lateral wall (9), the air intake section (4) and the air delivery section (5).
9. The device according to claim 8, **characterised in that** the casing (8) is mounted on wheels (10) and equipped with a handle (11) for moving it.

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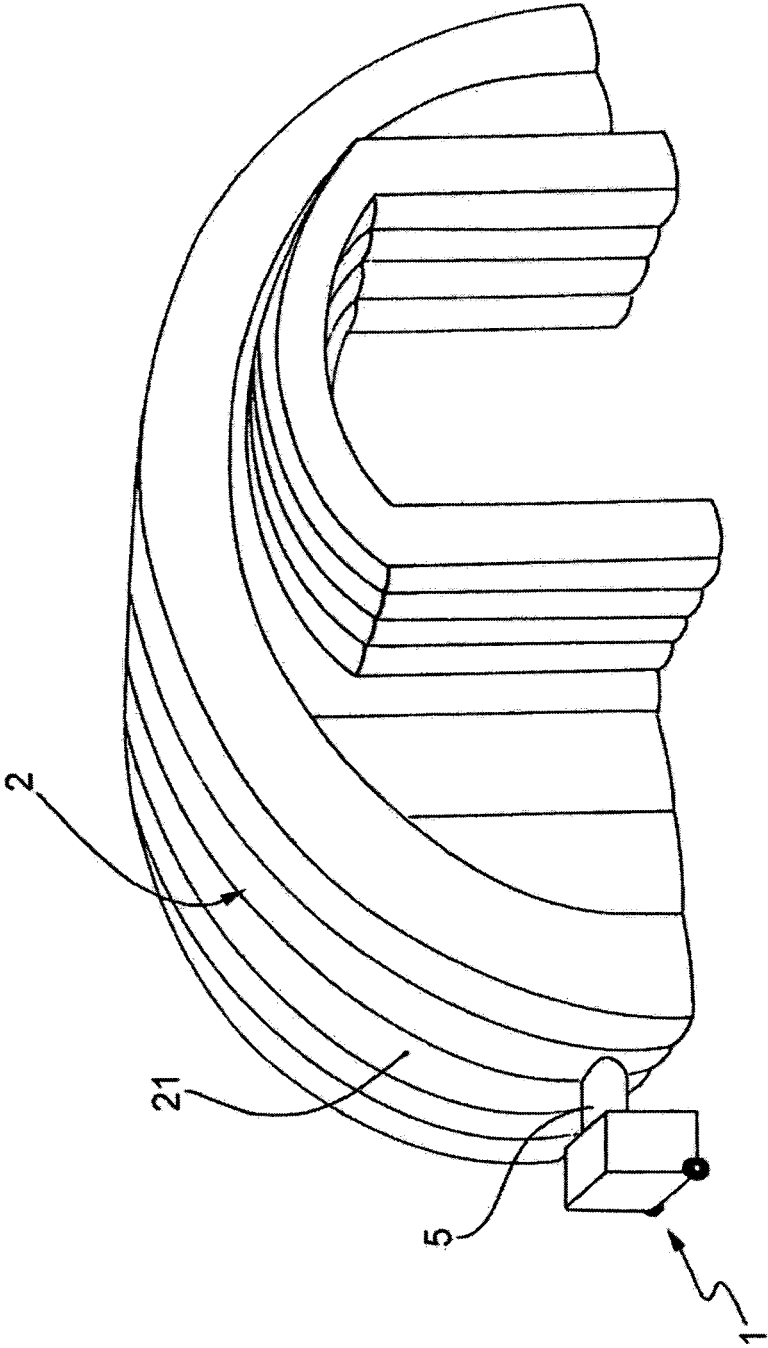
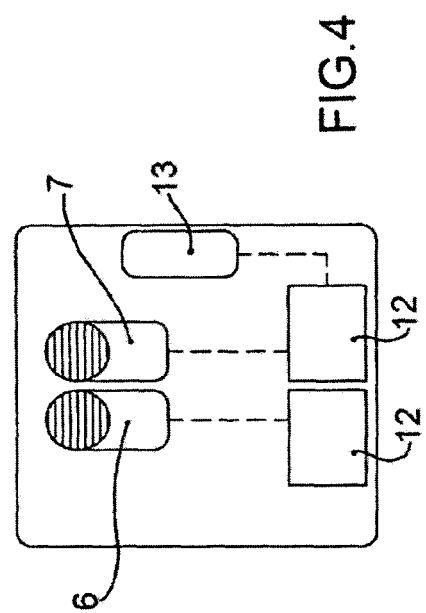
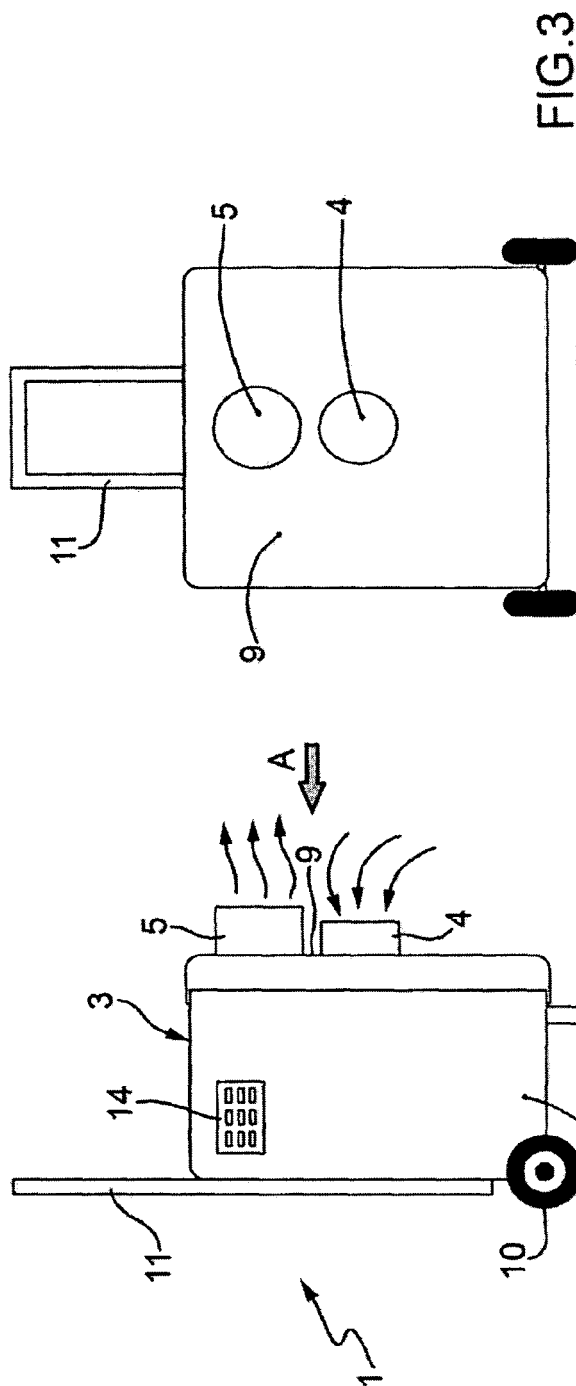


FIG.1





EUROPEAN SEARCH REPORT

Application Number
EP 09 00 8448

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 318 369 A (PAGE GEORGE [GB]) 22 April 1998 (1998-04-22)	1-6	INV. E04H15/22
A	* page 6, line 3 - line 9 * * page 7, line 24 - page 9, line 25; figures 2,4-7 *	7	
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A	DE 16 84 561 A1 (KRUPP GMBH) 25 November 1971 (1971-11-25) * page 3, line 18 - page 4, line 19; figures 1,2 *	1,6,8,9	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E04H
Place of search		Date of completion of the search	Examiner
Munich		30 October 2009	Stefanescu, Radu
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
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 00 8448

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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