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(72) Inventor: **Focaracci, Alessandro**
00191 Roma (IT)

(74) Representative: **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
20122 Milano (IT)

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(71) Applicant: **Prometeoengineering.IT S.r.l.**
00191 Roma (IT)

(54) **Survival module for one-way double barrel tunnels**

(57) A survival module for a one-way double barrel tunnel comprises, within a tunnel double barrel joining duct (2), a chamber including, at end portions thereof, an access prefabricated structure (10) having inlet and out-

let doors (11,12) arranged adjoining an electric apparatus storing closed space (13), a cylindric body (20) including a fan (21) and a related fire barrier gate (22) being arranged on the top of said closed space.

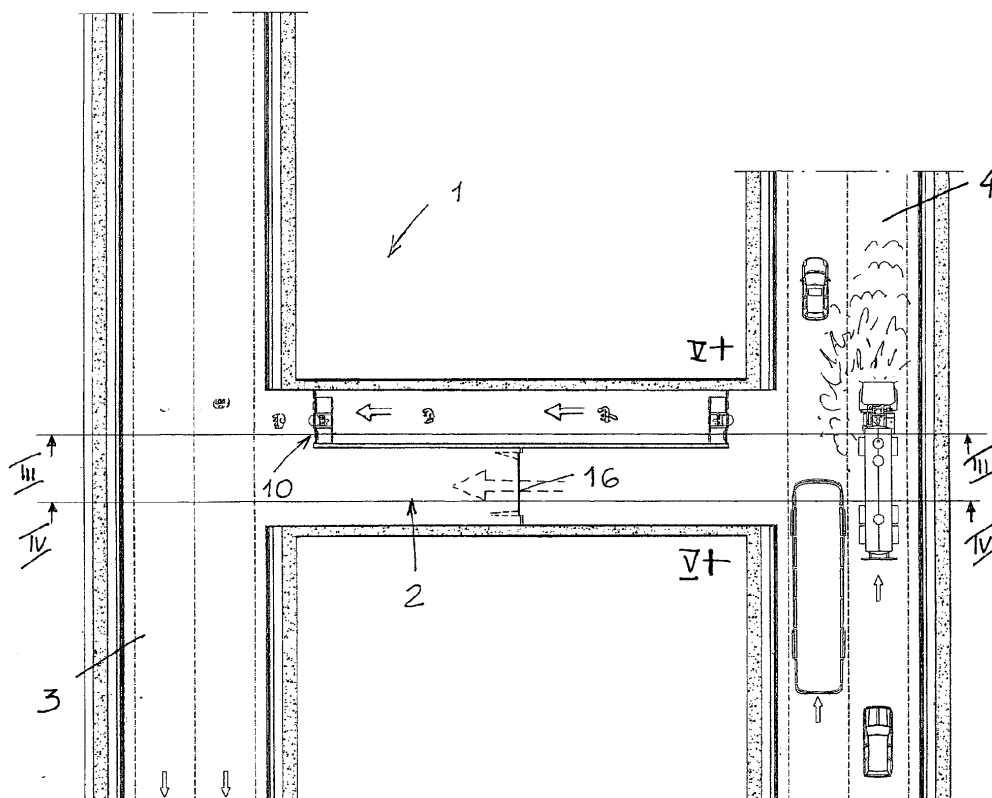


FIG. 1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a survival module for one-way double barrel tunnels.

[0002] As is known, one-way double barrel tunnels conventionally comprise, at preset spacings, joining ducts which operate to allow an evacuation from a tunnel barrel to the other tunnel barrel, as, for any reasons, dangerous condition occur.

[0003] To that end, at the joining duct, it is necessary to provide a plurality of separating regions with openable openings to allow pedestrian and, in some cases, also vehicular crossings.

[0004] Prior solutions for meeting the above requirements provide to make very complex structures which are made, as necessary, in situ, without making criteria allowing to provide standard solutions and an optimum operation thereof.

SUMMARY OF THE INVENTION

[0005] Accordingly, the aim of the present invention is to solve the above mentioned problem, by providing a survival module for one-way double barrel tunnels, which may be prefabricated and easily and quickly installed, thereby allowing related safety criteria to be standardized.

[0006] Within the scope of the above mentioned aim, a main object of the invention is to provide such a survival module allowing to form, in a very easy and practical manner, a region safely separated from dangerous zones in one of the tunnel barrels, thereby allowing the users both to quickly evacuate the dangerous region and to resist against high temperatures.

[0007] Another object of the present invention is to provide such a survival module which, owing to its specifically designed constructional features, is very reliable and safe in operation.

[0008] Another object of the present invention is to provide such a survival module which can be easily made starting from easily available elements and materials and which, moreover, is very competitive from a mere economic standpoint.

[0009] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a survival module for one-way double barrel tunnels, **characterized in that** said survival module comprises, within a joining duct for joining a double-barrel tunnel, a chamber comprising, at end portions thereof, an access prefabricated structure with an inlet door and an outlet door arranged adjoining an electric apparatus storing closed space, above said closed space a cylindric body including a fan and related fire barrier gate being arranged.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of a survival module for one-way double barrel tunnels, which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a schematic top plan view showing a double-barrel tunnel with a walking-on and carriageable joining duct;

Figure 2 shows a double-barrel tunnel with a walking-on joining duct;

Figure 3 is a cross-sectional view substantially taken along the section line III-III of figure 1;

Figure 4 shows a further cross-sectional view substantially taken along the section line IV-IV of figure 1;

Figure 5 shows a further cross-sectional view substantially taken along the section line V-V of figure 1;

Figure 6 shows yet another cross-sectional view substantially taken along the section line VI-VI of figure 2;

Figure 7 is a front elevation view showing a prefabricated access construction:

Figure 8 shows the prefabricated access construction as seen from the top and cross-sectioned at a high level thereof;

and

Figure 9 is a left side elevation view of the access structure.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] With reference to the number references of the above mentioned figures, the survival module for one-way double barrel tunnels, according to the present invention, comprises a module chamber, schematically indicated by the reference number 1, formed in a joining duct 2 arranged between the one-way barrels or tubes 3 and 4 of a double-barrel tunnel.

[0012] According to the invention said chamber comprises, at each end portion thereof, a prefabricated structure, generally indicated by the reference number 10, which includes an inlet door 11 and an outlet door 12 which are arranged adjoining a closed space 13 which may be used for storing or recovering electric apparatus therein.

[0013] Above the closed space 13 a cylindric body 20 including a fan 21 interconnected to a fire barrier gate 22 is provided.

[0014] In said prefabricated structure 10 it is further possible to provide a series of safety elements comprising a video camera 30 for monitoring the encompassing environment, a fume detector 31 and an environment pressure switch 32.

[0015] Moreover, a fitting sleeve 5 adjoining the fan 21

and a hot wire flow-meter 35 are also provided.

[0016] On the front of the above structure are furthermore arranged an asymmetric projector 40 and a closed space interface 41 cooperating with an intercommunication audio system 42.

[0017] The prefabricated structures 10, for an exclusively walking-on duct, are arranged in a front framework, generally indicated by the reference number 15, operating as a duct encompassing and closing element.

[0018] For a walking-on and carriageable duct, said structures 10 are coupled to one another by concrete coupling walls 16 which, at a middle portion thereof, comprise adjoining walls 16 including openable doors for allowing emergency means or vehicles to pass therethrough.

[0019] From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

[0020] In particular, the fact is to be pointed out that the invention provides a safety structure including therein all the necessary safety elements, thereby greatly facilitating the installation operations and providing optimum standardized safety.

[0021] The invention, as disclosed, is susceptible to several modifications and variations, all of which will come within the scope of the invention.

[0022] Moreover, all of the constructional details can be replaced by other technically equivalent elements.

[0023] In practicing the invention, the used materials, provided that they are compatible to be intended use, as well as the contingent size and shapes, can be any, depending on requirements.

monitoring pressure switch.

5. A survival module, according to one or more of the preceding claims, **characterized in that** said survival module comprises, at said structure, an asymmetrical projector. 5
6. A survival module, according to one or more of the preceding claims, **characterized in that** said survival module comprises, at said structure, an audio communication system. 10
7. A survival module, according to one or more of the preceding claims, **characterized in that** said survival module comprises, at said structure, a hot-wire flow meter. 15
8. A survival module, according to one or more of the preceding claims, **characterized in that** said structure comprises a walking-on duct and is housed in a tunnel closing framework. 20
9. A survival module, according to one or more of the preceding claims, **characterized in that** said structure comprises both a walking-on and a carriageable joining duct and is coupled to chamber defining concrete walls. 25
10. A survival module, according to one or more of the preceding claims, **characterized in that** said chamber is arranged, at a middle portion thereof, near carriageable passage openable doors. 30

Claims

1. A survival module for one-way double barrel tunnels, **characterized in that** said survival module comprises, within a joining duct for joining a double-barrel tunnel, a chamber comprising, at the end portions thereof, an access prefabricated structure with an inlet door and an outlet door arranged adjoining a closed space for storing therein electric apparatus, above said closed space a cylindric body including a fan and related fire barrier gate being arranged. 35 40 45
2. A survival module, according to the preceding claim, **characterized in that** said survival module comprises, at said structure, a video camera. 50
3. A survival module, according to the preceding claims, **characterized in that** said survival module further comprises, at said structure, an analogic fume detector. 55
4. A survival module, according to one or more of the preceding claims, **characterized in that** said survival module further comprises an environmental

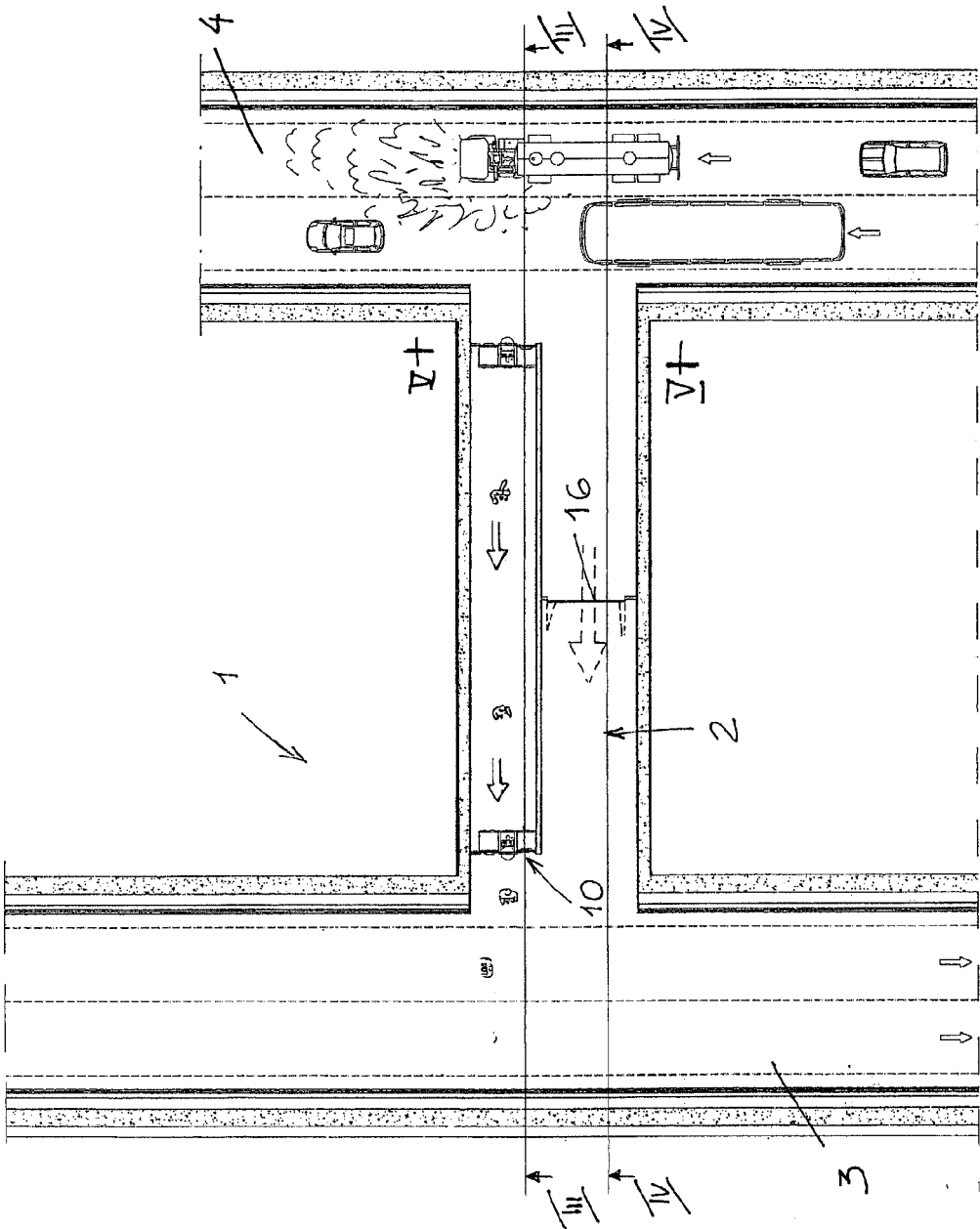


FIG. 1

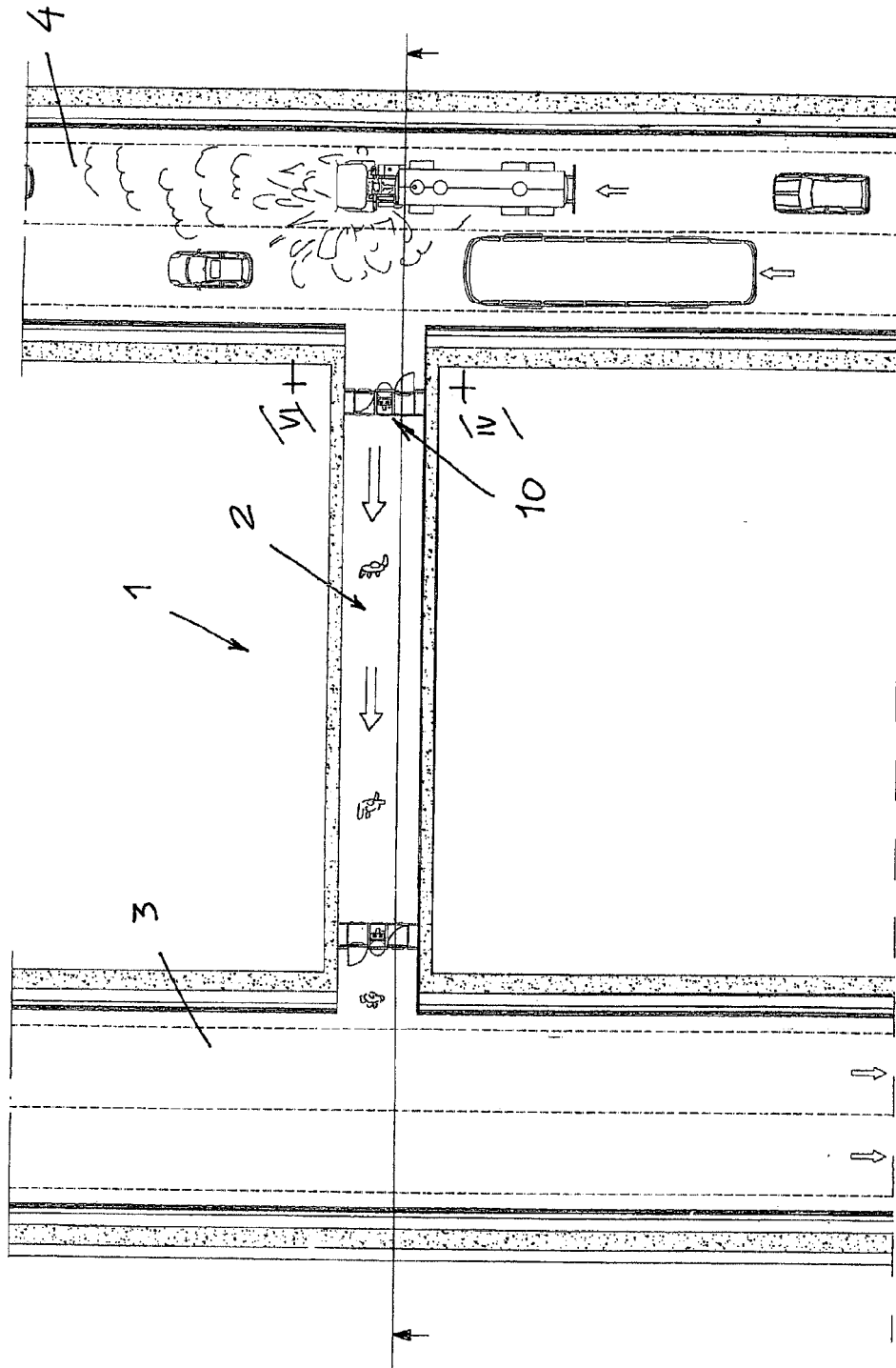


FIG. 2

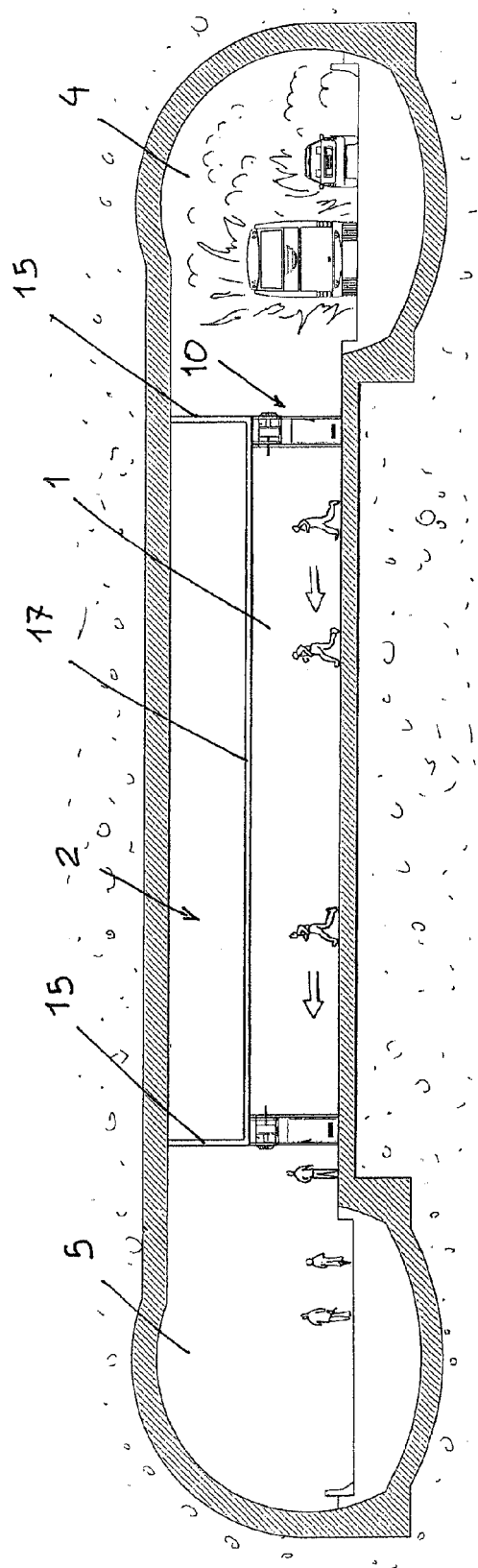


FIG. 3

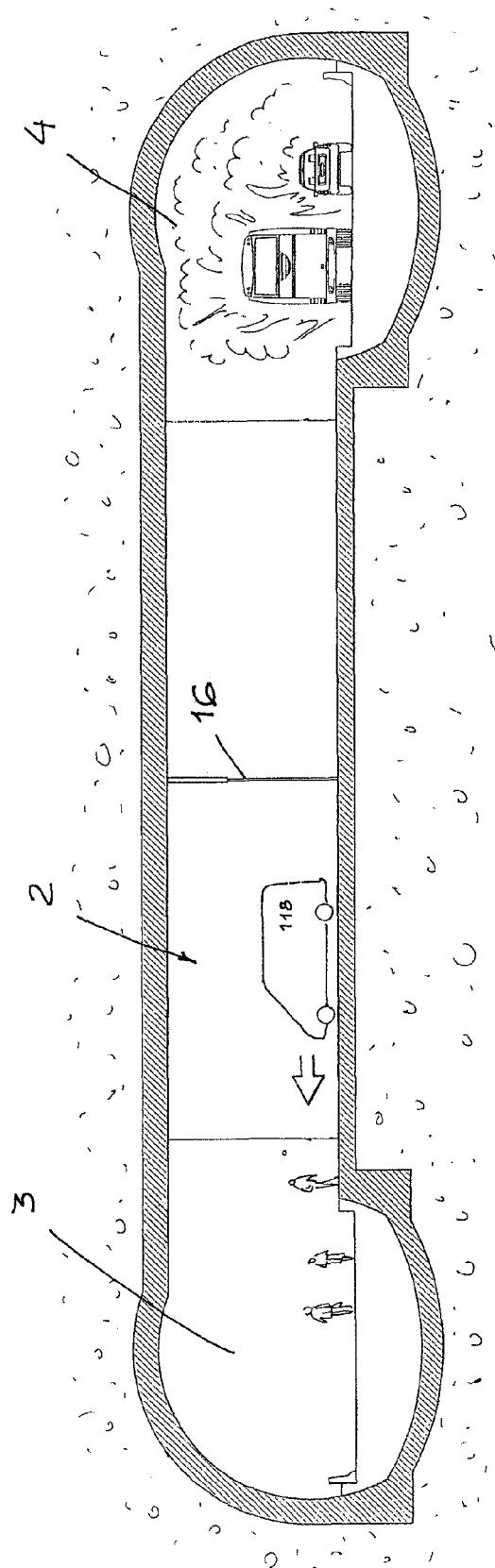


FIG. 4

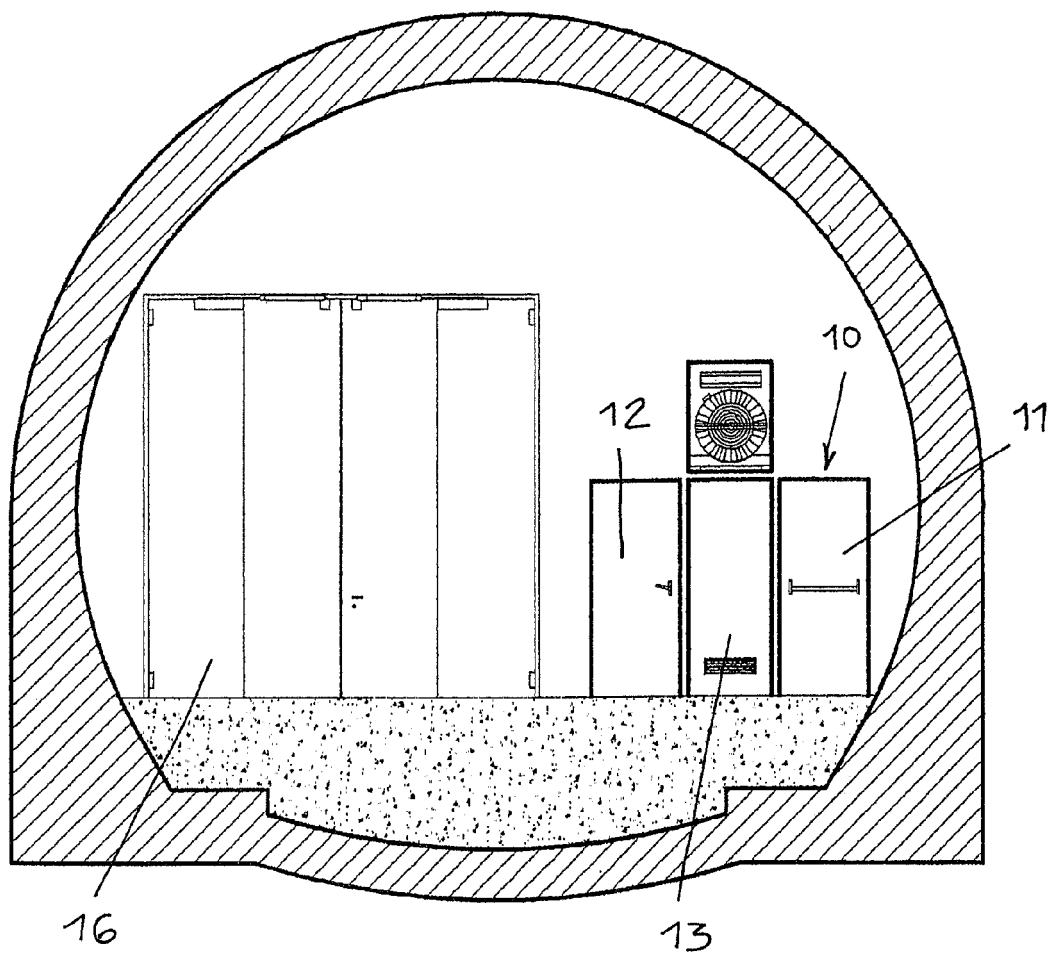


FIG. 5

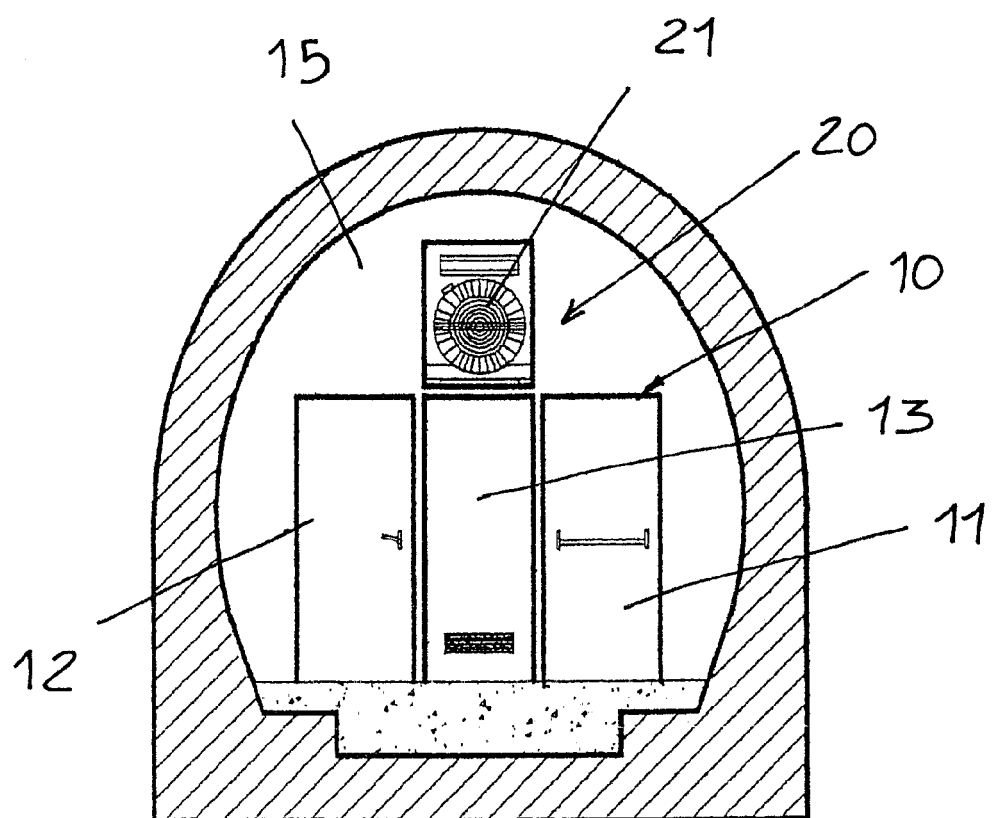


FIG. 6

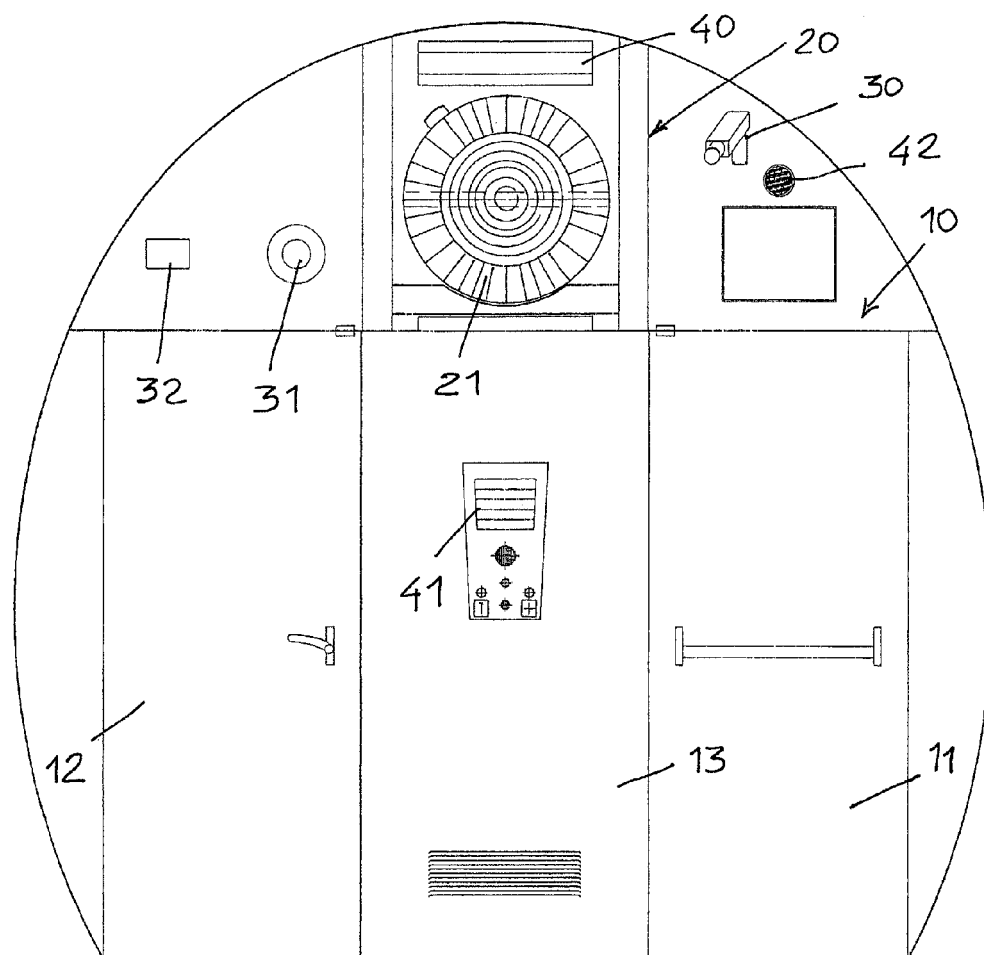


FIG. 7

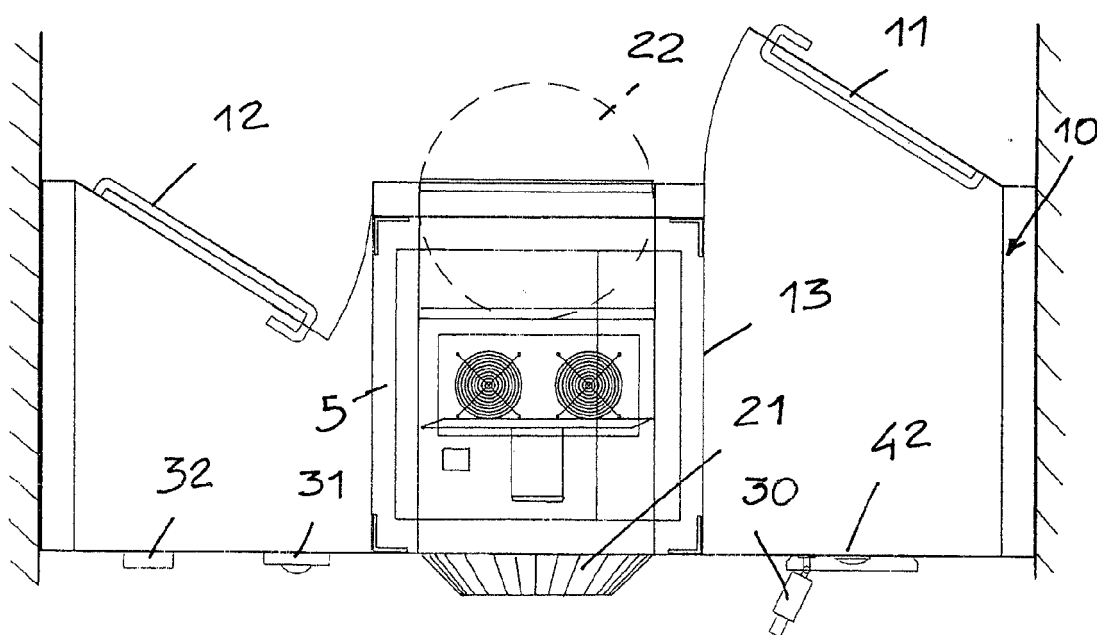
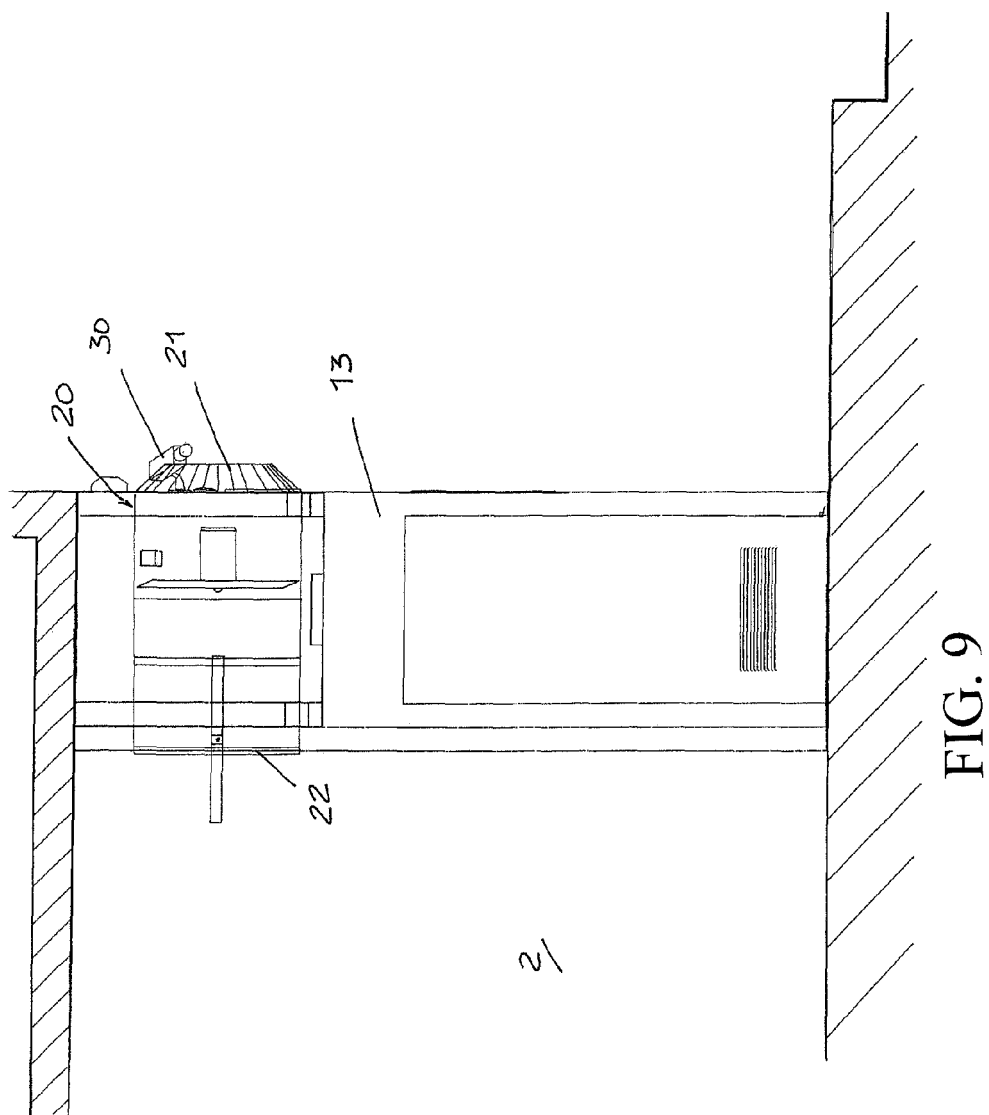


FIG. 8





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 1919

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	KR 2009 0007769 U (YONG-WAN SEOL) 31 July 2009 (2009-07-31) * abstract; figures 5-11 * -----	1-10	INV. E21F5/00 E21F11/00
Y	WO 2007/094688 A1 (ACONA GROUP AS [NO]; VASSMYR KJELL ARE [NO]; AASEROED MARTIN IVAR [NO]) 23 August 2007 (2007-08-23) * page 7, lines 5-35 * -----	1	
Y	WO 98/40607 A1 (MASKIN A S ARGO [NO]; HAALAND SVEIN [NO]) 17 September 1998 (1998-09-17) * page 8, line 33 - page 9, line 8 * * figure 1 * -----	1	
Y	WO 2006/086994 A1 (OULED HADJ YUCEF ABDELHAMID [DZ]) 24 August 2006 (2006-08-24) * paragraph [0016] - paragraph [0019]; figure 5 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E21F A62C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 June 2010	Examiner Manolache, Iustin
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 (P4/C01)

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

EP 10 16 1919

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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28-06-2010

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