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(71) Applicant: **Delorme, Benoit**
Blainville, Québec J7B 1Z2 (CA)

(72) Inventor: **Delorme, Benoit**
Blainville, Québec J7B 1Z2 (CA)

(74) Representative: **Jakelski & Althoff**
Patentanwälte PartG mbB
Patentanwälte
Partnerschaftsgesellschaft
Mollenbachstraße 37
71229 Leonberg (DE)

(54) INSULATED SLAB-ON-GRADE FOUNDATION SYSTEM

(57) A foundation system (1) and method of installing the foundation system. The system including plurality of modular slabs (3, 3A, 3B) mountable onto a gravel layer (2); and at least one horizontal isolating slab (5A, 5B, 5C) and a vertical edge portion (4) positioned with respect to the modular slabs (3A, 3A, 3B) for creating a receptacle wherein concrete is poured thereon.

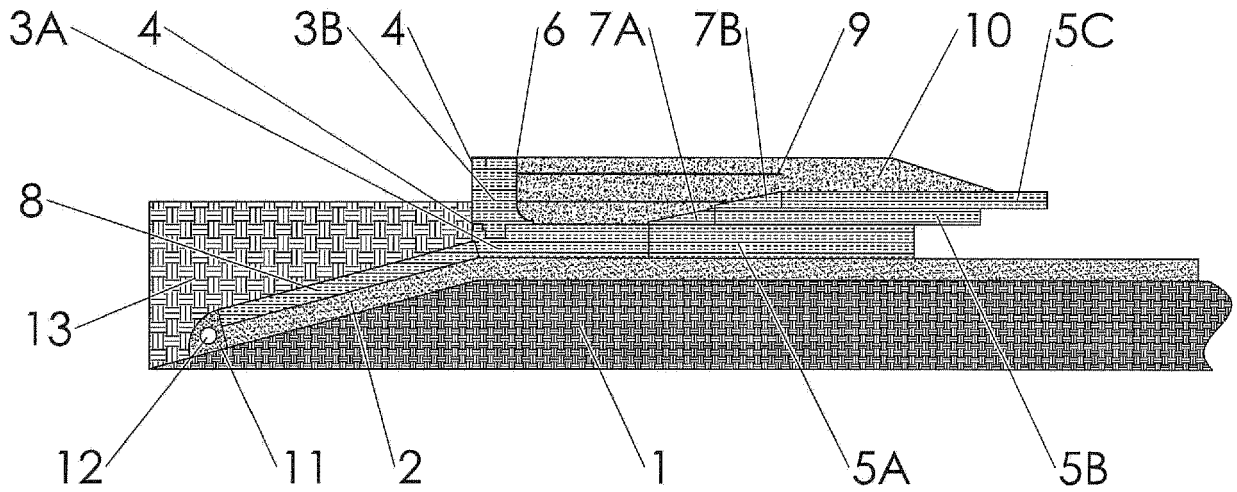

FIGURE 4

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a system of insulated slab-on-grade foundation system to protect building shallow foundations and is more particularly concerned with method of installing such system.

BACKGROUND OF THE INVENTION

[0002] It is well known in the art to use insulated slab-on-grade foundation system to protect shallow foundations. More particularly, the invention pertains to an insulated slab-on-grade foundation system and it method for shallow foundation. The typical isolation system for foundation does not adjust and is fixed or does not adapt to the different dimension of shallow foundations.

[0003] Accordingly, there is a need for an improved insulated slab-on-grade foundation system with a simple configuration.

SUMMARY OF THE INVENTION

[0004] It is therefore a general object of the present invention to provide an improved insulated slab-on-grade foundation system.

[0005] An advantage of embodiments of the present invention is that the insulated slab-on-grade foundation system may have the capacity to adapt to any size projects such as building, housing, garage and other construction project.

[0006] Another advantage of embodiments of the present invention is that the insulated slab-on-grade foundation system may be more efficient than known systems.

[0007] A further advantage of embodiments of the present invention is that it may be made mostly of EPS (expanded polystyrene material), it may be pre-shape, it may not be molded and therefore may be less expensive.

[0008] Still another advantage of embodiments of the present invention is that the isolated frost protection made of said EPS may be pre-shaped in one part or more likely in two different parts so as to allow an easy installation process.

[0009] Another advantage of embodiments of the present invention is that the installation process may become easier because of the dovetail pre-form can fit together.

[0010] Still a further advantage of embodiments the present invention is that the isolated frost protection may be made of EPS in two smaller parts as compared to one large piece and so easier to operate.

[0011] According to a first aspect of the present invention, there is provided that the isolated frost protection stays in place after the pouring of the concrete because of the locking mechanism provided by the dovetail.

[0012] In a second aspect of the present invention, there is provided an isolated frost protection system for saving time, energy, and relatively less costly and adaptable to any type of construction.

[0013] Other objects and advantages of the present invention will become apparent from a careful reading of the detailed description provided herein, with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Further aspects and advantages of the present invention will become better understood with reference to the description in association with the following Figures, in which similar references used in different Figures denote similar components, wherein:

Figure 1 is a side section view of an insulated slab-on-grade foundation system, in accordance with an illustrative embodiment of the present invention;

Figure 2 is a, in accordance with a second illustrative embodiment of the present invention;

Figure 3 is, in accordance with a third illustrative embodiment of the present invention; and

Figure 4 is a, in accordance with a fourth illustrative embodiment of the present invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0015] With reference to the annexed drawings the preferred embodiments of the present invention will be herein described for indicative purpose and by no means as of limitation.

[0016] Referring to Figure 1, there is schematically shown an embodiment of an insulated slab-on-grade foundation system, in accordance with a preferred embodiment of the present invention. The system is preferably installed on a natural soil layer 1 without humus. The soil layer 1 is excavated or arranged so that one portion thereof has an horizonal soil surface and another portion thereof has slanted soil surface. On top of the soil layer 1, there is disposed a layer of net gravel 2 for draining purposes. The gravel layer 2 is arranged so as to follow the profile of the soil layer 1 with one portion thereof having an horizonal gravel surface and another portion thereof having slanted gravel surface. On top of the gravel layer 2, there is disposed a modular slab 3. The modular slab 3 includes a peripheral vertical edge portion 4 made of metal for surrounding and holding different modules around the perimeter of the modular slab 3. The modular slab 3 includes a first isolating portion 5A made of rigid EPS (expanded polystyrene material) disposed along the internal surface of the modular slab 3. A vapor barrier 6 may be installed on top of the second isolating portion 5A. The modular slab 3 includes a second isolating por-

tion 5B made of rigid EPS (expanded polystyrene material) disposed on top of the first isolating portion 5A along the internal surface of the modular slab 3. The second isolation portion 5B includes a slanted transitional portion 7A. The modular slab 3 may also include an external skirt portion 8 that extends outwardly and is disposed on top of the slanted gravel surface. Concrete 10 is poured into the modular slab 3 and rebars or reinforced bars 9 are installed in the concrete 10. At the bottom of the slanted gravel portion there is a drain 12 surrounded by gravel 11. On top of the skirt portion 8 there is a layer of filling and soil 13 for finishing the outer surroundings of the modular slab 3.

[0017] Referring to Figure 2, there is schematically shown another embodiment of an insulated slab-on-grade foundation system, in accordance with second preferred embodiment of the present invention. It is similar to the one shown in Figure 1 and the same reference numbers refer to the same elements. In this second embodiment, the modular slab 3 includes a third isolating portion 5C made of rigid EPS (expanded polystyrene material) disposed on top of the second isolating portion 5B along the internal surface of the modular slab 3. The third isolation portion 5C includes a second slanted transitional portion 7B.

[0018] Referring to Figure 3, there is schematically shown another embodiment of an insulated slab-on-grade foundation system, in accordance with third preferred embodiment of the present invention. It is similar to the one shown in Figures 1-2 and the same reference numbers refer to the same elements. A modular slab 3A of different shape as the one of Figure 1 is used.

[0019] Referring to Figure 4, there is schematically shown another embodiment of an insulated slab-on-grade foundation system, in accordance with fourth preferred embodiment of the present invention. It is similar to the one shown in Figures 1-3 and the same reference numbers refer to the same elements. A modular slab 3B of different shape as the one of Figures 1-2 is used

[0020] Preferably, the components of the modular slab 3, 3A or 3B are prepared in the workshop according to the size and the customer's plan.

[0021] Then, one has to prepare the ground before installing the modular slab 3, 3A or 3B. In a first step, one has to remove the top soil or vegetal part of the ground where the modular slabs 3, 3A or 3B are to be installed. One has then to arrange a gravel layer of thickness of preferably about 4 inches to 6 inches so has to provide a suitable drainage. Between the soil layer 1 and gravel layer 2 there may be a geotexile fabric so as to not lose the gravel.

[0022] Then, one determines the four corners where the modular slab 3, 3A or 3B are to be installed. A preferred length size of a modular slab 3 made of EPS is about 4 feet. One then completes with the other modules made of EPS all around the periphery.

[0023] The internal corners are made by crossing cross of two modules 3 (and/or 3a shown in Figure 3) right with 8 inches extending beyond of one of the two segments on the perimeter. A flat panel fills this internal junction to achieve a 90 degrees internal corner.

[0024] One then installs a mechanical link, such as a U-shaped metal plate 4 (1 5/8 inches wide) that connects all modules 3 throughout the perimeter thereof 3b. Each U-shape metal plate 4 of may be superimposed and secured by self-taping screws.

[0025] The inner surface of the perimeter modules 3 (an/or 3a) are filled with EPS that is to say the first row insulating panels 5 are installed.

[0026] The assembly of the second part of the top modular part 3b (module a (3b) made of EPS - length of 8 feet) is joined by a junction in a key way - Two modules (3b) cut 45 degrees in pairs make the outer corners. The perimeter segments must be completed with right modules (modular part A (3b) in EPS - length of 8 feet).

[0027] One then installs a mechanical link, such as a U-shaped edge portion 4b that is made of metal (2 1/2 " wide) that will make the joint on all modules throughout the perimeter of modules A 3b. Each U-shaped portion 4b of metal is joined by overlay and secured by self-tapping metal screws.

[0028] The junction of the modules A 3a and B 3b is done by the key path which allows an adjustment of the final level of the perimeter of the reference modules for the pouring of the concrete.

[0029] This adjustment of the keyway between the module A and B may be fixed by insulated spray in a can.

[0030] A vapor barrier 6, which is preferably of a minimum 10 mm, is installed within the entire project area. All attached to the U-shaped metal portion 4 so as to perform jointing of A modules

[0031] The next step involves installation of a transition module (1/2 " - 3"x 12 " length of 8') inside MODULE A (at a distance of 24' 'from the internal top of module A) this module is parallel (24 " internal distance) from module A of the project.

[0032] The new inner surface of the transition module is filled with EPS-second row insulation board.

[0033] Some installations require a second transition module after the second row EPS insulation, if it is the case then a third row of insulation made of EPS may be required.

[0034] An EPS insulation board fits into the outer bottom of module B at the outer perimeter to make a frost protection skirt over the entire outer perimeter. (The dimensions of this EPS panel are based on the ground freeze calculation for the project region).

[0035] Although the present invention has been described hereinabove by way of specific embodiments thereof, it can be modified, without departing from the spirit and nature of the subject invention defined in the appended claims.

Claims

1. A foundation system (1) comprising:

   plurality of modular slabs (3, 3A, 3B) mountable onto a gravel layer (2); and
   at least one horizontal isolating slab (5A, 5B, 5C) and a vertical edge portion (4) positioned with respect to the modular slabs (3A, 3A, 3B) for creating a receptacle wherein concrete is poured thereon.

2. The foundation system of claim 1, wherein the horizontal isolating slab (5A, 5B, 5C) is made of expanded polystyrene material.

3. The foundation system of claim 1, further comprising reinforced bars (9) installed in the receptacle.

4. The foundation system of claim 1, further comprising a vapor barrier (6) installed on top of an isolating slab (5A, 5B, 5C).

5. The foundation system of claim 1, further comprising a peripheral skirt (8) extending outwardly beyond the receptacle.

6. A method of installing a foundation system, comprising:

   arranging a gravel layer (2) on top of a soil layer (1);
   disposing a plurality of modular slabs (3, 3A, 3B) onto the gravel layer (2);
   disposing at least one horizontal isolating slab (5A, 5B, 5C) and a vertical edge portion (4) with respect to the modular slabs (3A, 3A, 3B) for creating a receptacle wherein concrete is poured thereon.

7. The method of claim 6, further comprising installing reinforced bars (9) in the receptacle.

8. The method of claim 6, further comprising installing a vapor barrier (6) on top of an isolating slab (5A, 5B, 5C).

9. The method of claim 6, further comprising installing a peripheral skirt (8) extending outwardly beyond the receptacle.

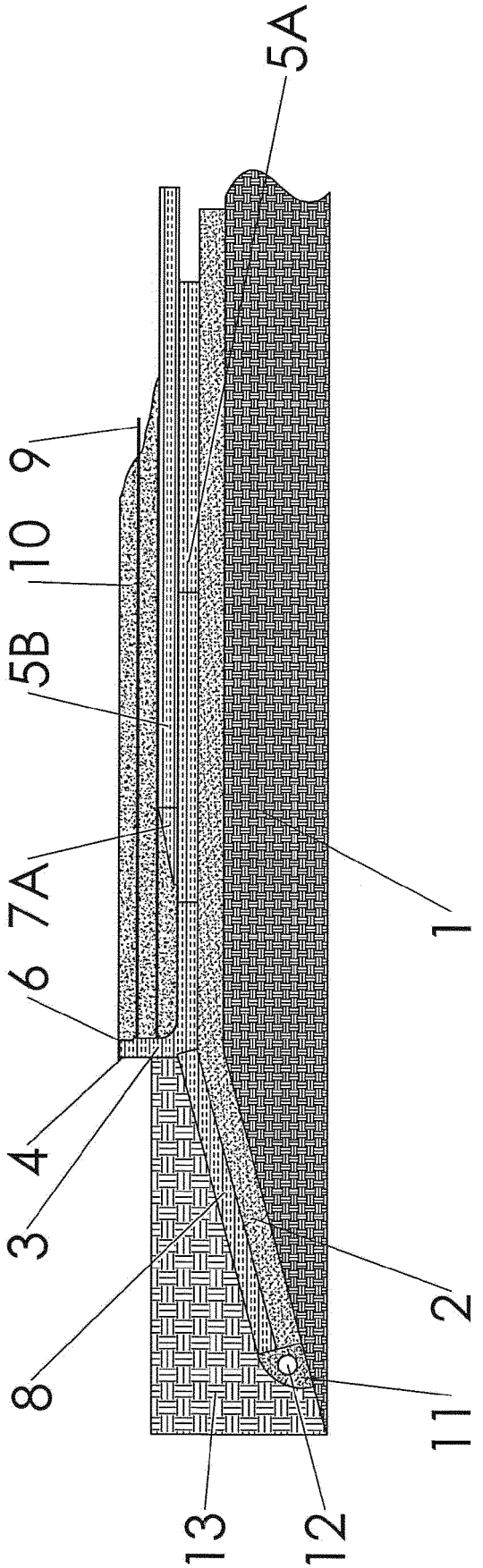

FIGURE 1

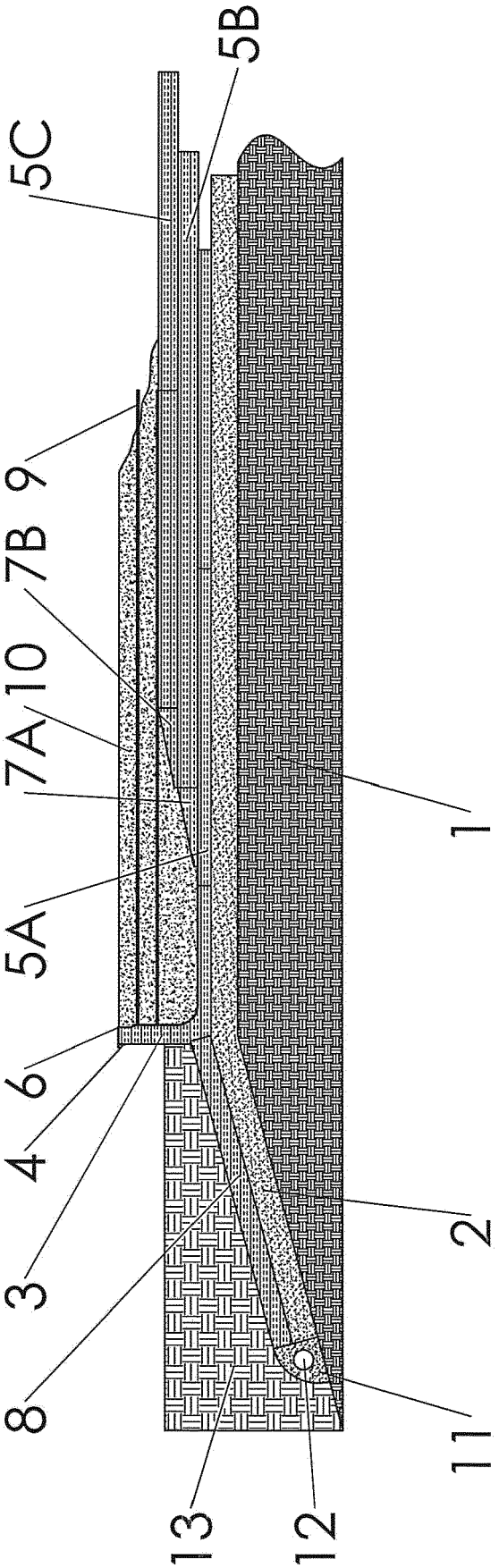

FIGURE 2

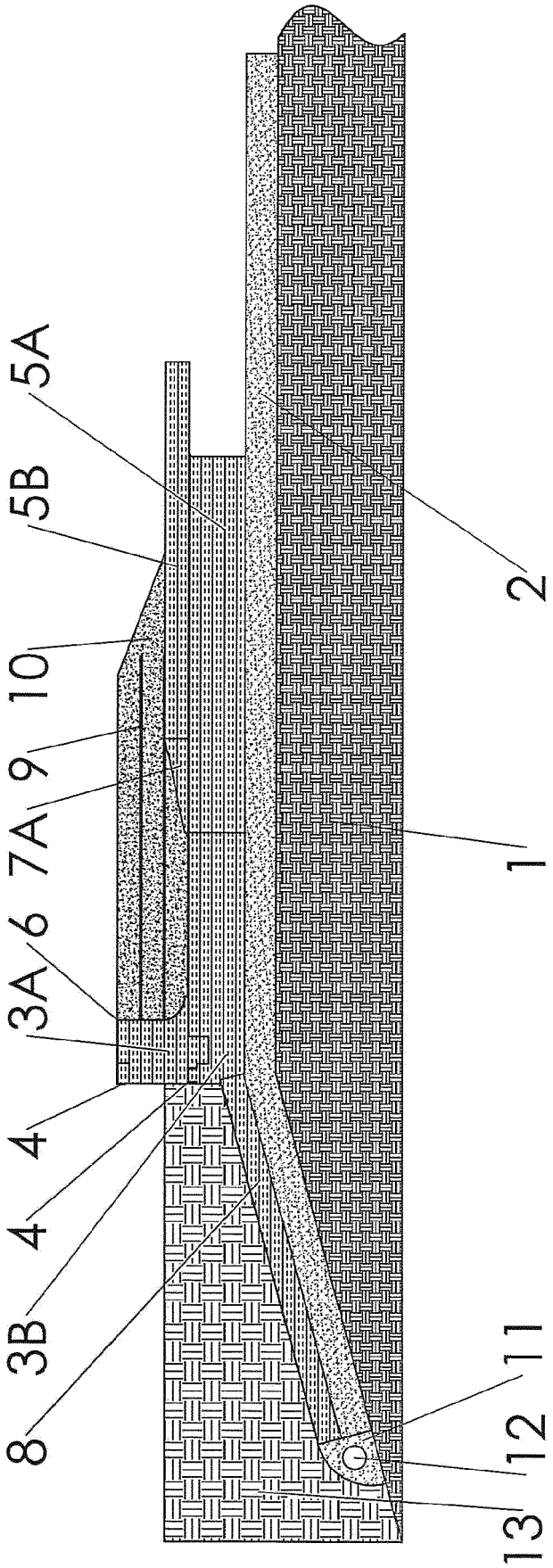

FIGURE 3

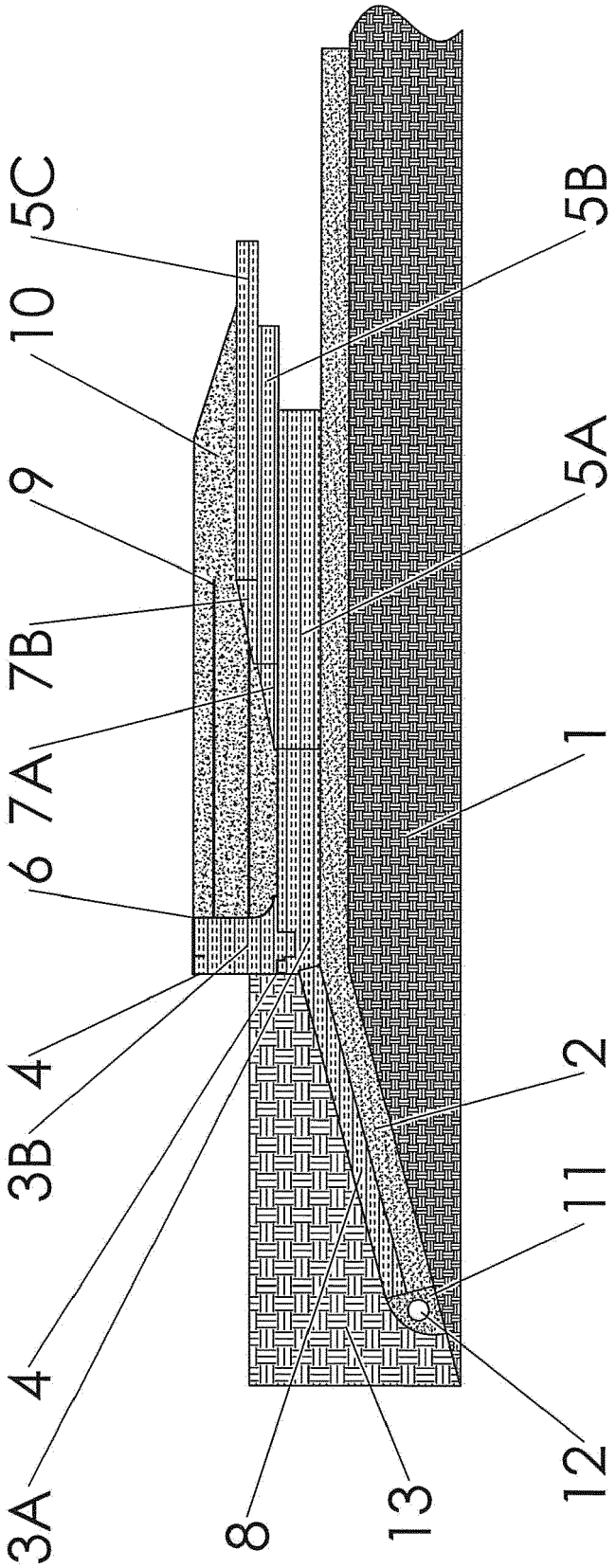

FIGURE 4

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EUROPEAN SEARCH REPORT

Application Number
EP 18 20 6280

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	DE 297 09 300 U1 (THERMOZELL ENTWICKLUNGS UND VE [AT]) 26 March 1998 (1998-03-26) * page 6, line 15 - page 15, line 32; figures 1-3 *	1-9	INV. E02D27/02 E02D31/14
X	US 8 656 653 B1 (O'MALIA MATTHEW [US] ET AL) 25 February 2014 (2014-02-25) * column 2, line 35 - column 4, line 17; figures 1-3 *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)

E02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 January 2019	Koulo, Anicet

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 20 6280

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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25-01-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29709300 U1	26-03-1998	DE 19801123 A1	03-12-1998
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