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(54) **EXTERNAL THERMAL INSULATION SHEET**

(57) The invention relates to a thermal insulation facade sheet, made of different grades of expanded polystyrene, extruded polystyrene or rock wool, depending on the application, and to which, during its installation, one or more support plugs are applied. The supporting

plugs are covered with caps to form a smooth surface for further coating application. The thermal facade sheet has shaped recesses into which the support plugs are inserted. In this way, proper application, economy and speed in the installation are achieved.

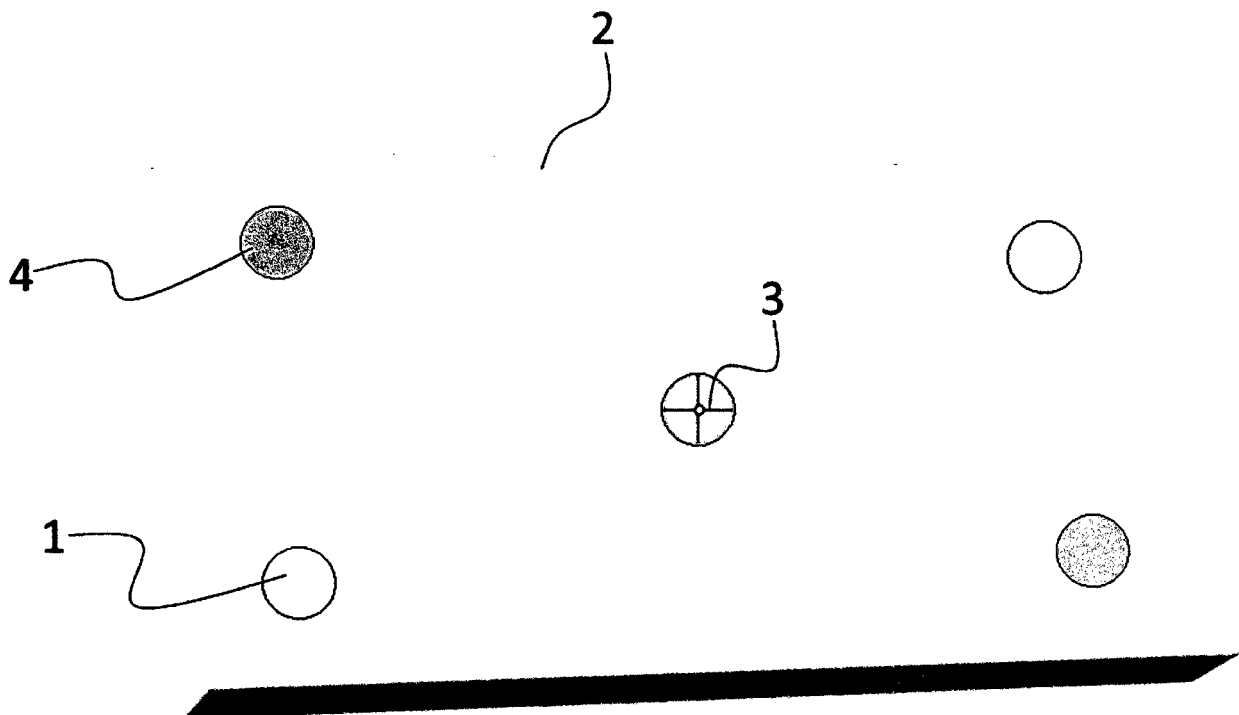


Fig.1

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Description

FIELD OF ART

[0001] The invention relates to the field of construction art and more specifically to the field of insulation or other protection of buildings and even more specifically to the individual insulation elements of a building. In particular, it refers to a thermal insulation facade sheet with shaped recesses.

BACKGROUND OF THE INVENTION

[0002] The thermal insulation facade sheet disclosed in the present invention has not been disclosed in the prior art.

[0003] Insulation in buildings provides resistance to heat flow. The greater the heat flow resistance provided by the insulation, the greater the reduction in heating and cooling costs. The right way to insulate the building further improves comfort and living conditions. Thermal insulation is the slowing down of heat transfer between objects that are in thermal contact or at a distance sufficient to be affected by radiation. Heat is energy that is transferred due to the temperature difference and is transferred from one object of higher temperature to another of lower temperature. In the case of buildings heat tends to go from lower to higher layers and the cold air goes down. The purpose of the thermal insulation materials of a building is to slow down the thermal flow in objects or spaces that are at different temperatures. Thermal insulation blocks or reflects energy instead of absorbing energy.

[0004] A subcategory of thermal insulation is the external thermal insulation in which insulation is not interrupted at the joints of the different structural elements. External thermal insulation or thermal facade insulation, as it is otherwise called, has been applied in western and central Europe since the 1960s and offers great flexibility in construction, as the thermal insulation material is placed as the last layer of construction on the outer surface of the building. In essence, it functions as a protective envelope so that the appearance of the building is not altered by extreme temperature conditions and adverse climatic agents. In addition, with the thermal facade insulation, besides strength provided to the building, its waterproofing is achieved. Finally, this reduces the heat loss from the side walls and saves energy. It is also the most suitable and most effective solution for the retrospective thermal insulation of old constructions. The materials used for the external thermal insulation are expanded polystyrene, extruded polystyrene and stone wool. Expanded polystyrene is the most suitable and widespread material that is the best possible solution for old and new constructions.

[0005] Expanded polystyrene is a lightweight rigid plastic foam insulation material, which is produced from compact polystyrene granules. In fact, it consists of 98%

air, having a very low weight and excellent thermal insulation properties. In addition, expanded polystyrene sheets have structural stability and do not decompose, have low values of coefficient of resistance to water vapor diffusion and have the ability to "breathe" preventing the formation of water vapor condensation. In addition, they work excellently with most building materials, while they are fully recyclable and environmentally friendly.

[0006] These characteristics and advantages of expanded polystyrene have led to its widespread use for thermal insulation applications and especially in thermal facade applications. However, due to cost reasons or lack of skills and knowledge of the workers who undertake to complete the applications, the end result is often not successful. This is because the installation of expanded polystyrene sheets is often done in the wrong way, the support and materials used are not suitable, and also the operations on the polystyrene sheets, which are done in situ, create imperfections that are very difficult to cover. During installation, the sheets are placed and glued onto the wall, before plugs are placed in the recesses of the sheets, so that the plugs do not protrude from the surface. The plugs are then covered with either caps or polyurethane foam. In this way the coating can be applied to a smooth surface. Many times in practice, however, the recesses are either not made or made on the spot, with the result that they are not symmetrical and the cap cannot be applied. Then the solution is to apply the glue in the existing gap to cover the hole, which is not a correct application and which costs more.

[0007] A further disadvantage of the on-site indentation is the generation of a large amount of dust, which is particularly harmful to humans. Installers must wear a mask and goggles, which is not often the case, resulting in inhalation of dust and cumulative strain on their respiratory system. In addition, the dust generated, especially in stone wool, can be transferred many meters away if it blows, making it harmful to locals or passers-by.

[0008] It is thus an object of the present invention to deal with the aforementioned disadvantages and shortcomings of the prior art by proposing a thermal façade insulation sheet.

[0009] A further object of the invention is to present a thermal facade sheet with shaped recesses for applying plugs at predetermined points thereof.

[0010] It is a further object of the present invention to provide a thermal facade sheet, which is placed on the outside of the thermal insulation and whose recesses are covered with caps, which create a smooth surface for the application of coating.

[0011] Advantages of the thermal facade sheet of the invention are that it is made of expanded polystyrene, extruded polystyrene or stone wool and offers better fit, speed during installation and economy.

[0012] These and other objects, features and advantages of the invention will become apparent in the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The invention will become apparent to those skilled in the art with reference to the accompanying drawings, in which it is illustrated, but not limited to.

Figure 1 is a perspective view of the thermal facade sheet of the present invention.

Figure 2 is a perspective 3D view of an alternative embodiment of the invention with different amount and points of application of holes.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0014] Referring now to the accompanying drawings, we will describe indicative embodiments of the thermal insulation façade sheet, in order to make apparent the advantages and the way of its implementation.

[0015] The thermal insulation facade sheet, Fig. 1, can be made of different grades of expanded polystyrene, depending on its compressive stress (in KPa) for 10% deformation. It can therefore be an expanded polystyrene sheet, such as of EPS80, 100, 150, 200 grades, depending on the pressure it withstands. It can of course be made of other suitable thermal insulation materials, such as extruded polystyrene and rock wool. The thickness of the sheet is at least 5 cm. The sheet has at least 5 circular recesses (1) or parts thereof, which in combination with corresponding parts of the adjacent sheets form a complete circle, Fig. 2. The recesses (1) are located on the outer surface (2) of the sheet, being of a diameter from 6 to 8 cm and 2 cm deep, for inserting plugs (3). The place of creation of each recess (1) may differ from sheet to sheet. The plugs (3) apply for the mechanical fastening of the sheets and after they have already been glued with the appropriate adhesive to the masonry. After applying the plugs, caps (4) of expanded polystyrene are placed, which cover the recesses (1) and are flush to the entire outer surface (2) of the sheet for the application of further coatings. The recesses (1) can be more than four and the places where they are located can vary from sheet to sheet, without affecting their placement and support.

[0016] On the back of the thermal facade sheet there may be advantageously an indication for the proper application of the adhesive, which is used for gluing to the masonry. The purpose of this indication is to guide the installer to apply the adhesive exactly there, so that when tightening the plug (3) there is the necessary resistance and to avoid the risk of breaking and crushing of the sheet because of the increased pressure that can be exerted.

[0017] It should be noted at this point that the description of the invention has been made with reference to non-limiting embodiments. Obviously, any change or modification in anything related to shape, dimensions, morphology, materials used, as long as they are not a new inventive step and do not contribute to the technical development of the already known are considered to be

contained in the purposes and aspirations of the present invention.

5 Claims

1. Thermal insulation facade sheet, with an outer surface (2), supported by means of using at least five support plugs (3), which are covered with a corresponding cap (4), **characterized in that** it has at least five shaped recesses (1) on its outer surface (2) for the application of the support plugs (3) and their covering with the cap (4).
2. The thermal insulation facade sheet according to claim 1, **characterized in that** it is made of expanded polystyrene.
3. The thermal insulation facade sheet according to claim 1, **characterized in that** it is made of extruded polystyrene.
4. The thermal insulation facade sheet, according to claim 1, **characterized in that** it is made of stone wool.

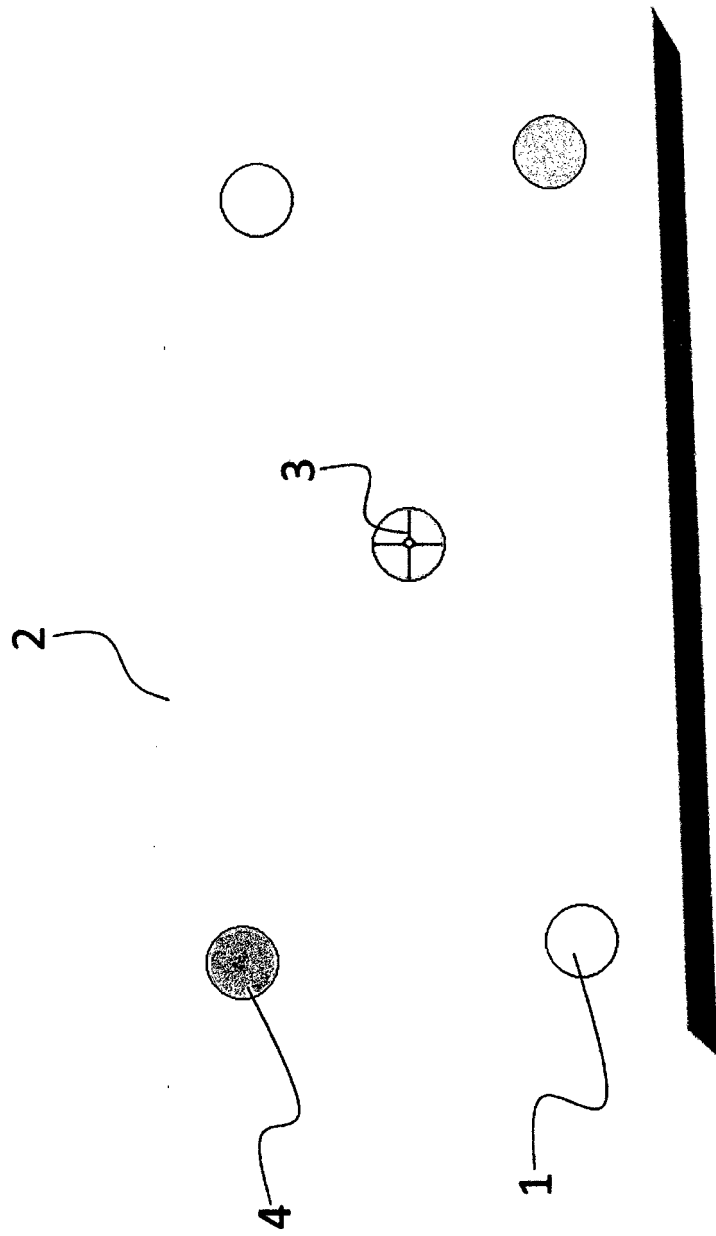


Fig.1

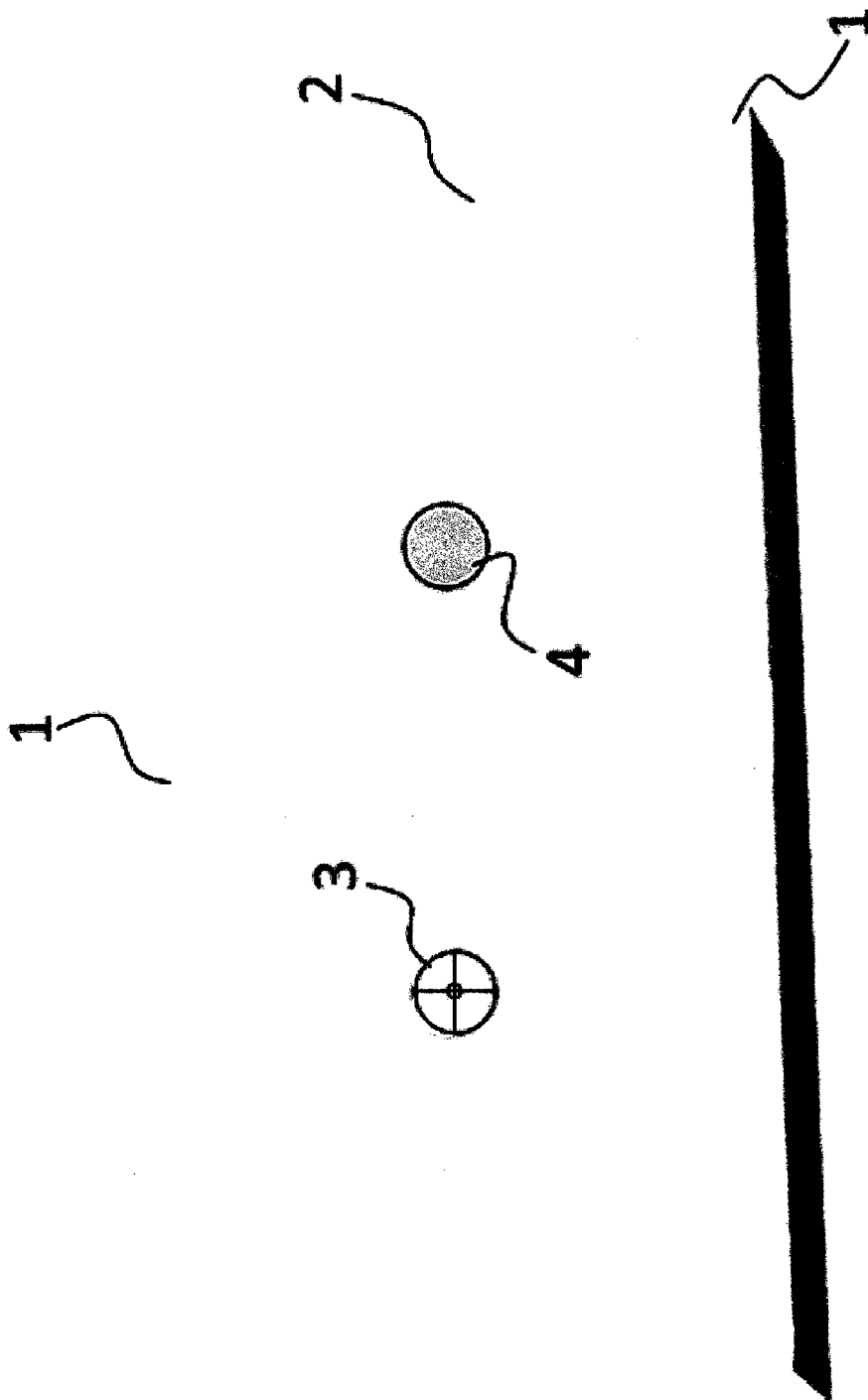


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 21 38 6039

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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 199 26 259 C2 (SCHWENK DAEMMTECHNIK GMBH & CO [DE]) 1 March 2001 (2001-03-01) * column 4, line 35 - column 5, line 61; figures 1-2, 4 *	1-4	INV. E04B1/76
X	EP 1 088 945 A2 (ROCKWOOL MINERALWOLLE [DE]) 4 April 2001 (2001-04-04) * paragraph [0034] - paragraph [0042]; figures 4-6 *	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 October 2021	Examiner Galanti, Flavio
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 21 38 6039

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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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82