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(54) Little porphyry cubes settling system by particular joints sealing

(57) It concerns a system that permits to solve several problems about the currently utilized sealing systems, with the main purpose to make the joints more elastic and thus more resistant to the mechanical stress and more weatherproof, with a superior quality of the

whole paving.

Essentially the invention peculiarity is given by the fact that the interstices between cubes, or joints, are first filled with rubble and then a single-component polyurethane resin (5) or other resin preferably of the elastomer family, is inserted in said interstices.

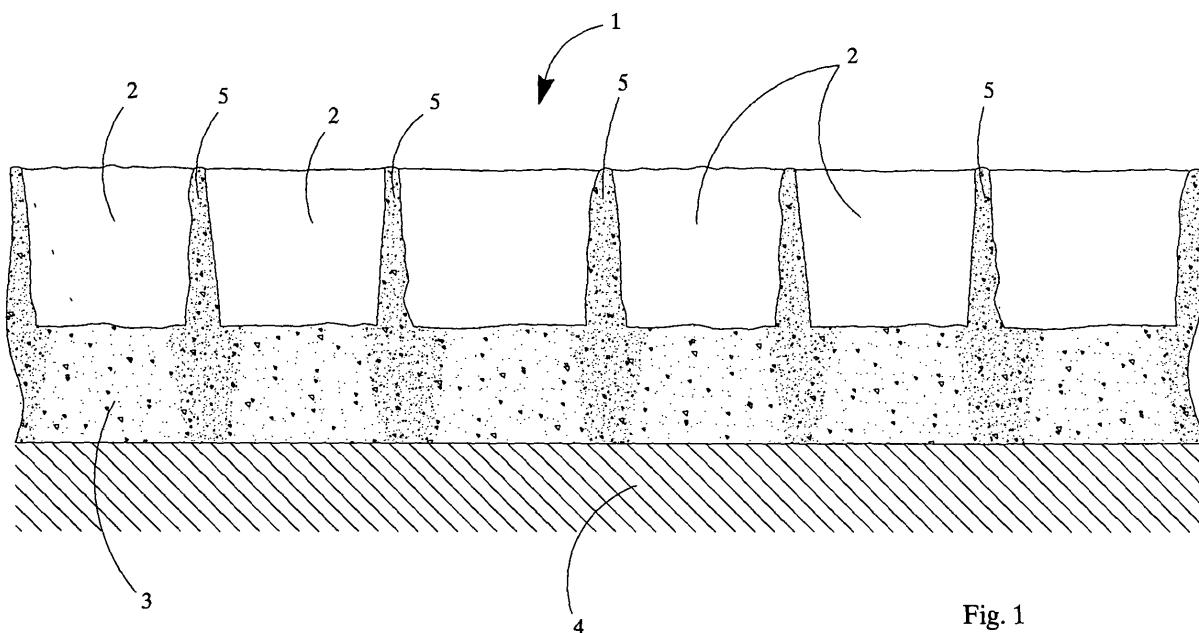


Fig. 1

Description

[0001] The present patent for industrial invention proposes a paving settling system, in particular a little porphyry cubes settling system, whose main characteristic concerns the particular joint sealing.

[0002] It concerns a system that permits to solve several problems about the currently utilized sealing systems, with the main purpose to make the joints more elastic and thus more resistant to the mechanical stress and more weatherproof, with a superior quality of the whole paving.

[0003] The system under discussion permits to make the laying of paving made of porphyry cubes, in comparison with the known solutions, with several essential advantages among which there are those related to the possibility that the paving can absorb impacts much better and it can stand loads and vibrations.

[0004] As everybody knows, stony materials, such as porphyry, are utilized for the realization of paving, stony materials which give a characteristic "pavé" effect to the paving.

[0005] Normally the porphyry paving are made laying the various little cubes on a sandy or inert bed, and in a way that the joints are filled with sand or with sand and cement (the so said cement grout), or with tar.

[0006] Nevertheless several defects were detected in these traditional systems, defects that can be grouped in three categories: sand joint defects, sand and cement defects and tar defects.

[0007] First of all sand joints are exposed to the washing away as a result of the flow of the rainwater or other kind of flow, they are subject to the suction made by sweeper machines and they present an overall weak tightness.

[0008] Besides sand joints are subject to the water stagnation with possible creation of potholes and exit of sand and cubes with consequent paving disconnectedness.

[0009] Cement joints are instead exposed to considerable thermal expansion, to grout crumbling in the time as a result to vibrations and loads, to fluorescence salt-petre with negative effects also as far as the aesthetic point of view is concerned, and besides they present a small elasticity, a weak tightness in the time and a noise increase.

[0010] First of all tar joints present the aesthetic defect of making the natural stone effect worse, they are difficult to be laid, odour and walking problems are noticed during summer period or in case of high temperature, as the tar tends to liquefy, while it presents excessive rigidity in case of low temperature.

[0011] The invention object is to have invented and realized a new system for making the joints sealing, able to remedy all this group of defects detected in the traditional joints of the porphyry or other stone material paving, with several both practical and aesthetical advantages.

[0012] Among the advantages found in the solution according to the invention, there are mainly those related to the elasticity, a remarkable capacity of absorbing knocks and standing both the loads, even heavy, and the vibrations.

[0013] Besides the sealing system in object presents advantages regarding the noisiness, which is remarkably reduced, since it is sound absorbent, and also advantages regarding the notable duration in the time, the resistance to sweeping machines, to cold, to heat, and to acids.

[0014] Further advantages given by the sealing system according to the invention are those related to the fact that this type of sealing adheres to the porphyry cube and forms a unique body with said cube, making all the paving bound.

[0015] Besides this sealing system doesn't alter the porphyry natural colours, but, on the contrary, it stands them up.

[0016] All the above aims and advantages are reached according to the present invention through a paving made of little cubes, ashlars or slabs in stony material or concrete, laid on a bed of draining or not draining inert material, characterized by the fact that the interstices between cubes, or joints, are filled with rubble and then single-component polyurethane resin or other resin preferably of the elastomer family, is inserted in said interstices, and by the fact that the resin penetrates into the empty spaces of the rubble and into the underlying layer of allurement inert material.

[0017] The resin adheres both to the inert material and to the stony material, binding all the materials in a unique elastic structure in order to react to the variable and disconnected loads of the even heavy traffic.

[0018] Further characteristics and particulars of the invention will be better understood from the following description, set forth as a non-limitative example thereof, making reference to the accompanying drawing in which the unique figure shows a schematic section view of the cubes paving according to the invention on the whole.

[0019] With reference to the enclosed figures, the paving as a whole, according to the present invention, is marked with 1, paving which is substantially constituted by a set of elements 2 in stony material or agglomerate, elements realized in the form of little cubes or slabs.

[0020] The elements or cubes 2 are normally laid on a layer of allurement inert material 3, which can be constituted by sand or rubble or other draining material, which can be set, in its turn, on a bed 4.

[0021] The invention peculiarity is given by the fact that the interstices between the cubes, or joints, are first filled with rubble and then a single-component polyurethane resin 5 or other resin preferably of the elastomer family, is inserted in said interstices.

[0022] The resin penetrates into the empty spaces of the rubble and into the underlying layer of allurement inert material.

[0023] As already mentioned previously, the resin inserted between the interstices in that way, adheres both to the inert material and to the stony element, binding all the materials in a unique elastic structure in order to react to the variable and disconnected loads of the even heavy traffic.

[0024] In comparison with the previous solutions, this is the innovative concept, that is not only a method of sealing the pieces or the slabs of stony material or conglomerate, but it represents a new paving structure since the resin is not used in mixture with other materials and it penetrates deeply.

[0025] This solution permits to obtain all the above-mentioned advantages, the most important of which are those related to the elasticity, with a remarkable capacity of absorbing knocks and standing both the loads and the vibrations both of the motor vehicles and the vehicles for road maintenance.

[0026] Besides the sealing system in object presents advantages regarding the noisiness, which is remarkably reduced, since it is sound absorbent, and also advantages regarding the notable duration in the time, the resistance to sweeping machines, to cold, to heat, and to acids.

[0027] It has to be underlined that this type of sealing adheres to the little porphyry cubes and it forms a unique body with said cubes, making all the paving bound and besides it doesn't alter the porphyry natural colours, but, on the contrary, it stands them up.

[0028] A technician of this field can make changes and variants to the formula of the resin to be inserted in the interstices, obtaining solutions which must be considered as included in the scope of protection of the invention itself in case such changes and variants should be included in the following claims.

5 paving interstices, adheres both to the inert material (3) and to the stony element (2), binding all the materials in a unique elastic structure in order to react to the different kinds of loads, to the mechanical stress, to the severe weather conditions and to the sudden changes of temperature.

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Claims

1. Paving made of little cubes, ashlers or slabs in stony material or concrete, laid on a bed of draining or not draining inert material, **characterized by** the fact that the interstices between cubes (2), or joints, are filled with rubble and then resin (5) is inserted in said interstices, and by the fact that the resin (5) penetrates into the empty spaces of the rubble and into an underlying layer of allurement inert material (3).

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2. Paving made of little cubes in stony material as claimed in the foregoing claim, **characterized by** the fact that said resin (5) that is inserted in the interstices, is not pre-mixed with the other inert filling materials, and it is a single-component polyurethane resin or preferably of the elastomer family.

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3. Paving made of little cubes in stony material as claimed in the foregoing claims, **characterized by** the fact that the resin (5), which is inserted in the

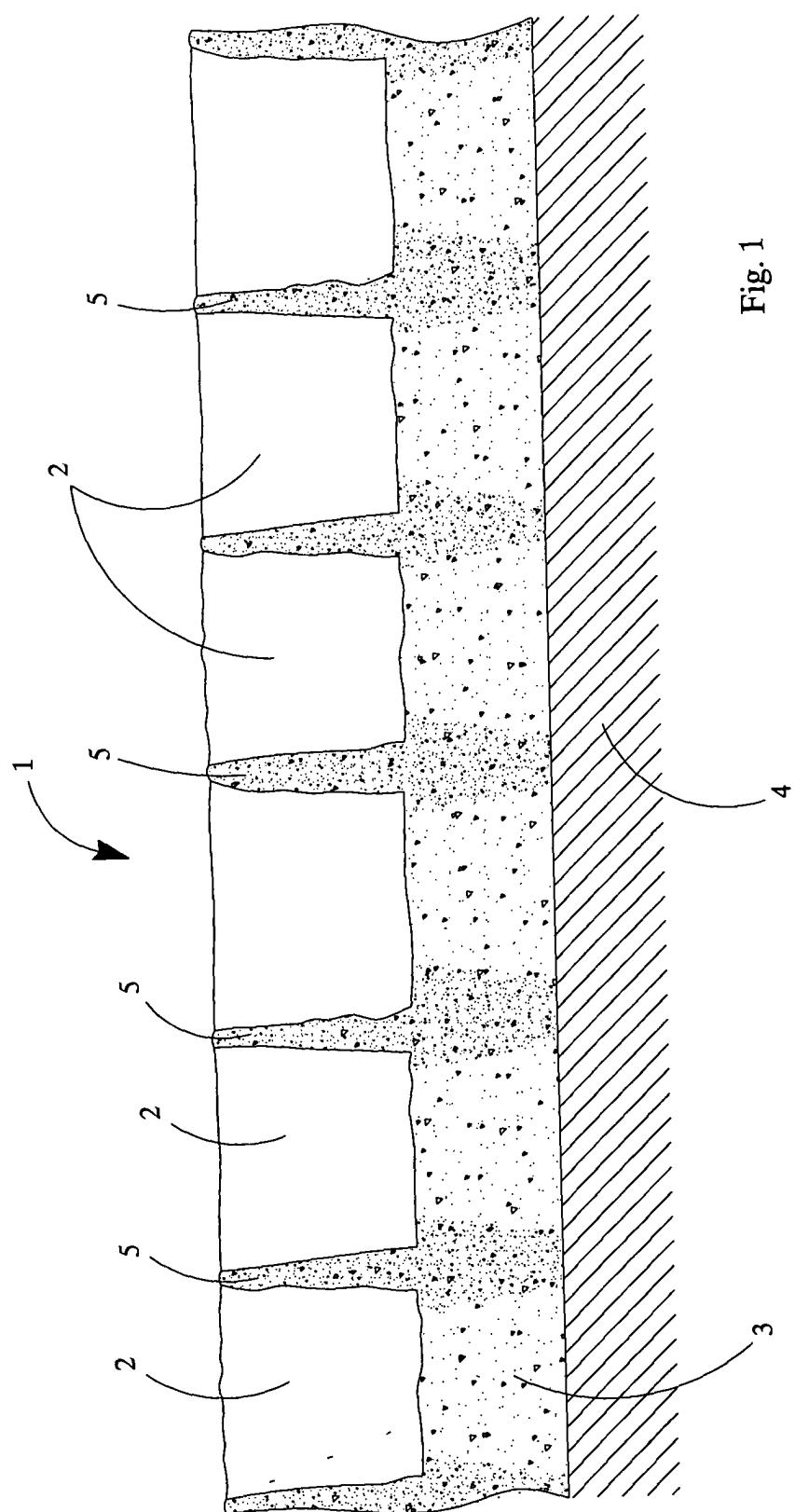


Fig. 1



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim			
X	DE 43 02 138 A (IWATA CO LTD) 7 October 1993 (1993-10-07) * the whole document * -----	1-3	E01C5/00		
X	WO 98/44033 A (CAIRN HOLDINGS UK LTD ; POLLITT CLIFFORD B (GB)) 8 October 1998 (1998-10-08) * the whole document * -----	1-3			
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)		
			E01C		
The present search report has been drawn up for all claims					
Place of search	Date of completion of the search	Examiner			
The Hague	25 October 2004	Dijkstra, G			
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					

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

EP 04 01 7601

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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