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(12) # EUROPEAN PATENT APPLICATION

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(54) **Pavement slab.**

(57) The slab (1) may be configurated in square and rectangular shape, the same conforming three perfectly differentiated coatings linked together, which form an homogeneous block the upper coating (2) being placed in the upper area and destinated to receive the atmosphere phenomena impact, as well as sustaining people walking upon it, the second coating (3) having linked thereto a material capable of absorbing the water coming from its surface which penetrates and runs through its inside down to the third coating (4) which is sensibly offset in regard with the axis of the upper coatings thus allowing ovelapping it, which has been manufactured in an insulating and waterproofing material.

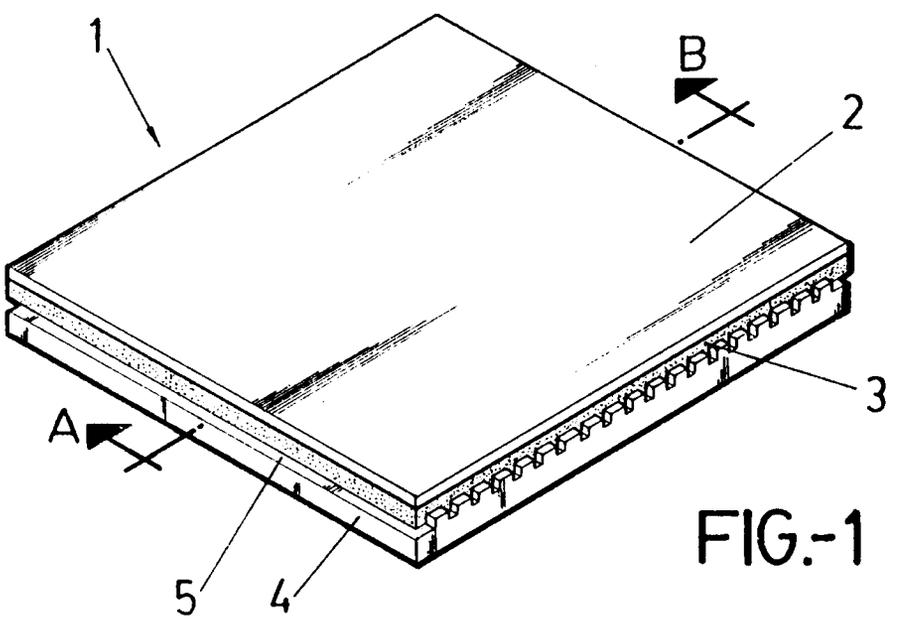

FIG.-1

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SUBJECT OF INVENTION

This present invention refers to a pavement slab the obvious aim of which it to be constituted as insulation and drainage element.

INVENTION SCOPE

This invention has its application within the industry devoted to construction, being specially fit to be used as an element aside from paving, constituted as insulation and drainage.

INVENTION BACKGROUND

There are at present in the marketplace a series of constructive solutions which have the aim to perform the pavement in a given area, even as the roof for a building, being forced at the same time to apply for the installation of an insulating element.

In order to obtain the drainage of the paved area, it is beyond any doubt that the installation performed in the construyctive solution must mandatorily incorporate a drainage in order to gain a way out for the water, mainly rainfall water.

This type of constructive solutions previously mentioned carries along simultaneously implicit, a high material weight, which must undoubtly be loaded upon the structure when it is incorporated on a building, and which due to its own specific idiosincracy may be considered as high weight materials.

It is known that one of the most frequent deteriorations observed in the traditional pavements installed in the open, as may be the building roof, is that they crack or buff.

It is known, as well, that among traditional deteriorations are the pleating or hollowing out thereof.

These problems are due, with no doubt whatsoever, to the rainfall water dampening the slab or the anchoring mortar, setting it inside the mass micropores.

When temperature descends, water gathered therein get frozen and consequently its volume increases, and it is due to this phenomenon that breakage and raising up of the pavement is forced and, at the same time, that of the anchoring materials used, since not being able to freely expand gives rise to this circumstance taking place.

This problems may cause, as well, losses in its staunch performance since the mortar adhered to the waterproof membrane becomes cracked and it carries along with it, and at the same time breaks due to the fact of soliciting enlargement, in only one point or line, which is impossible due to the waterproofing film which may support it.

The obvious solution to a problem like this would be to be able and obtain a filtering pavement which may be configurated starting from one slab, through which the water may rapidly vanish from the surface, by entering into the slab itself and by sliding towards the drainages or sumps through its inner part.

The slab considered as idoneous, as well, must be capable of performing when it is placed on fully plain covers in which drainage is performed by gravity and level increase, with the water remaining inside the slabs, these having been perfectly designed in order that in the event water should freeze in their inside this may be freely expand inside the slab through its macropores thus not giving rise, in view of the special constitution thereof to crackings.

The slab pretended to be idoneous should constitute by itself an insulating and draining pavement with a weight lower than the traditional one which, as a consequence thereof, implies a significant reduction in its dead weight which the forgings and structures should bear.

It is however not known up to this moment the existence of a filtering slab provided with these specifications.

The paving slab which the invention proposes, is fitted with the draining property in all senses, thus allowing to build benches, walls or ramparts directly upon it, with which the designer may place the sumps wherever he may deem fit, not bearing in mind the situation of the new constructions.

The placing of benches upon the paving slab for the installation of refrigeratina apparatuses and other machinery which are usually fit upon the cover, is most advantageous since it does not create any critical point since it does not strip the water flow and, besides, the cushioning resilience of the basis itself, considerably reduces the transmission of noises and vibrations to the buildings insides.

As stated above when describing the idoneous slab, the paving slab is constituted with the specification of being insulating and draining, being place on site with no anchoring material whatsoever, directly setting it upon the waterproofing itself on which stands its insulating coat, soft and cushioning by nature, with which it is obtained that not only the waterproofing or impermebealizing coating is not spoiled but at, the same time, that it may have an additional protection.

Pavements performed with this slab add up to some important advantages which are impossible to obtain with other additional constructive systems.

In synthesis, the paving slab being claimed is constituted as a filtering pavement, constituting a piece provided with three coatings.

The first coating is a concrete or cement mor-

tar with the adition of resins and pigments, which allows, besides obtaining a large variety of patterns by merely modifying the mould surface, making it in various colours and to increase its mechanical stress and confer stability against ultraviolet radiations.

The second coating is made in concrete, constituted by selected shape, mass and volume aggregates, with no fines in order to have micropores in its mass and, in this way, make it possible that water may pass throughout it in all directions.

The third coating is constituted of an insulating material, resisting freezing-defrosting, with a density lower than 35 kg/m^3, with a thermal conductivity lower than 0.04 w/m.C, with a compression resistance higher than 3 kg/m^2, with a low water absorption lesser than 0.2% in volume, lacking or nill capillarity, good shape stability and hard to burn.

The insulating and draining pavement performed with this slab is very light since in its context it only weighs one fourth of a conventional pavement, which implies a significative reduction in the dead weight it must be supported by forgings and structures.

The thermal resistance may be modified by simply altering the thickness of the insulating coating although on its lesser thick thickness it provides the cover with a thermal protection similar to that provided by a 5 centimeter thick cork coating.

With this slab, the resulting pavement is very resilient, since the anchoring material is being placed in every slab perimeter and, as such, an expansion joint is formed and, therefore, each slab freely moves with independence from all others thus accomodating itself to the support thermophysical motions.

With this paving slab it is also reduced the risk of damming up water due to drainage clogging, which in a traditional plain cover, as it is well known, due to the fact that the rainfall water will draw residues and leave deposited by the wind on its surface onto the sumps which, by building up therein, will clog the drainages thus provoking the roof overflow and giving rise to surcharges upon the structure.

Due to this paving slab, the full pavement constitutes a grill all along the cover area, which is absolutely impossible to clog.

The insulating coating supporting this paving slab has a perfect dimnmensional stability which avoids thermal bridges, since although the lineal dilatation coefficient in the insulating basis is of 0.07 mm/mC, this thermal movement is reduced by the intimate linking between the concrete coatings, and therefore the pavement thus obtained is practically stable.

In synthesis, the constructive solution obtained with this slab is very economical in regard with any other traditional solution due to the saving obtained in the materials motion and raising up to the cover, as well as due to the saving in the structure since the load upon the forging may be reduced due to the elimination of some critical points in the waterproofing and due to the fastness and easiness in the installating thereof since it is only required to manipulate one single piece.

The side step formed by offsetting the concrete coatings in regard with the insulating coating allows that the paving slab be overlapped onto the contiguous one; thus improving the pavement stability facing the suction of the eventual hurricane winds, since all slabs are assembled among them.

On the other hand, since the concrete coatings are somewhat smaller than the insulating coating, when placing it they are separated by some millimeters, with which it is obtained that the insulating coatings be at all times in close contact, thus avoiding that thermal bridges may build up, and as such favouring, with its grooves, the rainfall water to pass to the pavement inside.

This pavement slab is also provided to be installed in slanted flaps, loose by itself, that is with no anchoring materials, providing that the first slab row rests on a support.

It is very easy as well, as from the using of this paving slab, to create garden areas on the roof, since it suffices with building upon the draining slabs a low perypherical wall aimed to retain the vegetable soil, not being required to waterproofing it again to obtain the purpose sought for.

The paving slab complies in this case several functions:

- It thermally isolates.
- It protects the waterproofing membrane against damages caused with gardening tools.
- It is useful to drain the excess water built up in the garden area.
- It avoids that plants may get rotten.
- It holds the water allowing to make waterings sparse.

The free part between garden areas is adequate for walking transit, since both the situation and the shape of these garden areas may be modified by simply changing the low perypherical walls positions.

DESCRIPTION OF DRAWINGS

In order to complement the description we have been making herein and aiming to help to a better understanding of this invention's specifications, this present specification is accompanied, forming an integrating part thereof, by two drawing sheets, on which with illustrative and non-limitative

character, the following has been represented:

Figure number 1.- Shows a perspective view of the paving slab being the subject matter of this present invention.

Figure number 2.- Shows a plan view of the subject matter as shown under figure number 1.

Figure number 3.- Shows a side view of the subject matter as shown under figures 1 and 2.

Figure number 4.- Shows a duly sectioned side view of the subject matter as shown under the previous figures.

Figure number 5.- Shows a side view of the assembly of the paving slab being the subject matter claimed in this present invention.

Figure number 6.- Shows a plan view of the subject matter claimed in this present invention once it has been assembled.

Figure number 7.- Shows a perspective view of an area provided with the paving slabs being the subject matter of this present invention.

PREFERENTIAL INVENTION PERFORMANCE

In view of these figures, it may be noted how the paving slabs being the subject matter claimed in this present invention, which in the drawing sheets are shown as objects having a square base, may also be rectangular, and in which the square formed by the concrete coatings is slightly offset in regard with the lower coating axis in order that every paving slab may show, once configurated, a "half-wood cut" edge in order that a slab may overlap the adjoining one thus obtaining an additional resistance against the wind.

In syntheses, the paving slab (1) is provided with a coating which gives shape to its surface (2) which has been made based in compact mortars having various textures.

The slab has been provided with an intermediate coating (3) which has been made based on concrete absolutely free of fines.

The paving slab (1) has finally been provided with a third coating which constitutes the insulating coating and which has been referenced under (4).

As it has been discussed above, the upper coatings (2) and (3) which have been configurated based on concrete having different idiosyncracies are slightly offset in their context in regard with the simmetry axis existing in the lower coating (3) which, as it has been said above, constitutes the insulating coating itself.

The reason for this slight offsetting or deviation lies in the fact that the slab made shows a "half-wood cut" edge (5), which enables every slab to be overlapped with the adjoining one, consequently gaining an additional resistance against the wind.

It is obvious that due to the position of the concrete upper coating composed by coatings (2) and (3) of the paving slab, the paving slab itself may be overlapped on two of its sides, while, in turn, the same paving slab (1) is overlapped by the other two of its sides on which the upper surface has been withdrawn to form a step (5) useful to perform the overlapping upon it.

It may easily be understood that water falling upon the surface devoted to receive the erosion from the atmosphere phenomena, as well as the stepping of people upon it, since the water is immediately filtered onto the second coating (3), has been made, as it has been said above, in a concrete lacking of fines, thus perfectly absorbing the water in full, letting it slowly flow upon the insulating coating surface until it reaches the sumps.

It is not considered necessary to make a wider description for any expert in this matter to understand the scope of this invention and the advantages which may thus be obtained.

Materials, shape, size and elements disposition may be susceptible of variation, providing it all times that it does not imply any alteration in this present inventionm essence.

Terms under which this present specification has been described should be taken in their amplest and non-limitative sense.

Claims

1. Paving slab, of those aimed to be placed in the upper area of a building to constitute the covering itself and, in any other place as deemed fit, characterized by the fact that it is formed in three coatings linked together, which configurate an homogeneous block, the upper coating being placed in the upper area and destinated to receive the atmosphere phenomena impact, as well as sustaining people walking upon it, the second coating having been made in a material capable of absorbing the water coming from its surface which penetrates and runs through its inside down to the third coating manufactured in an insulating and waterproofing material, which is sensibly offset in regard with the axis of the upper coatings, thus allowing ovelapping the slab through its two sides.

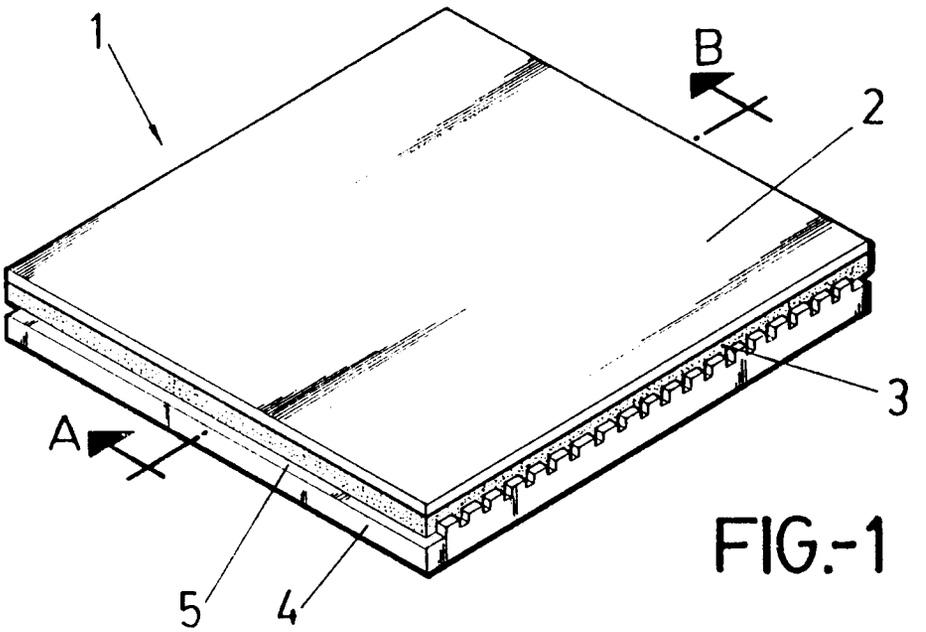

FIG.-1

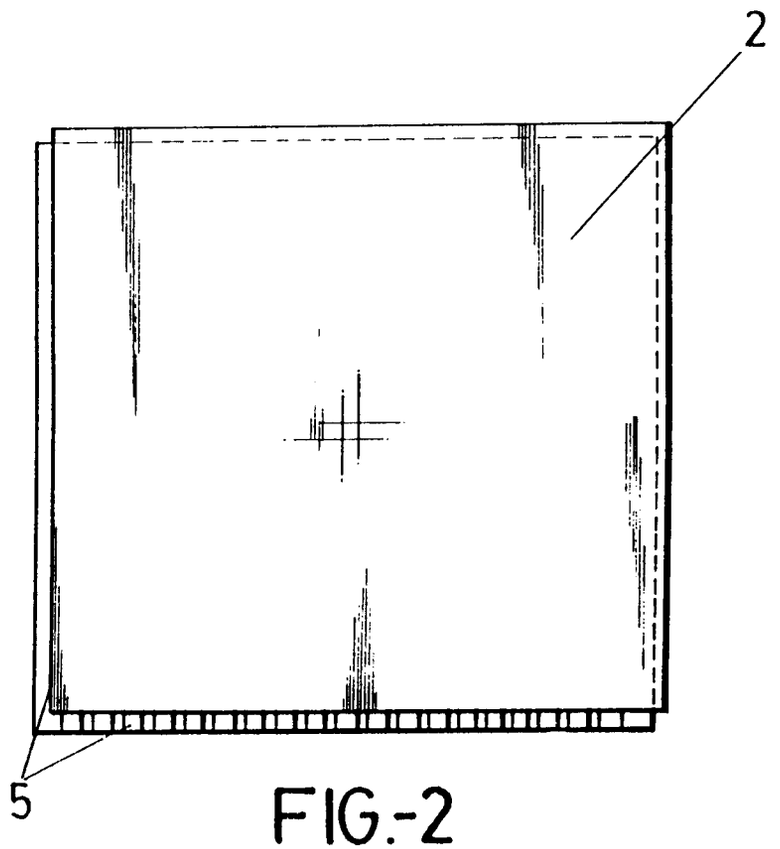

FIG.-2

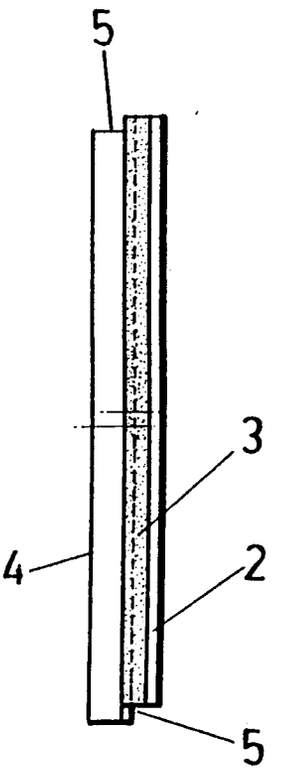

FIG.-3

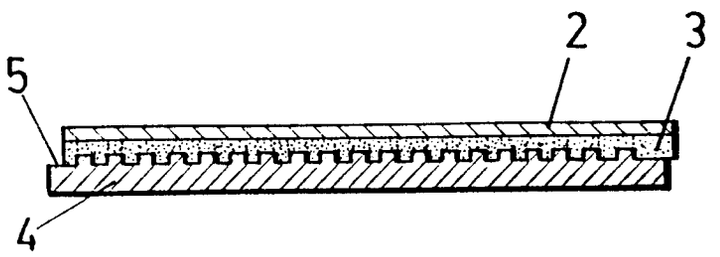

FIG.-4
A-B

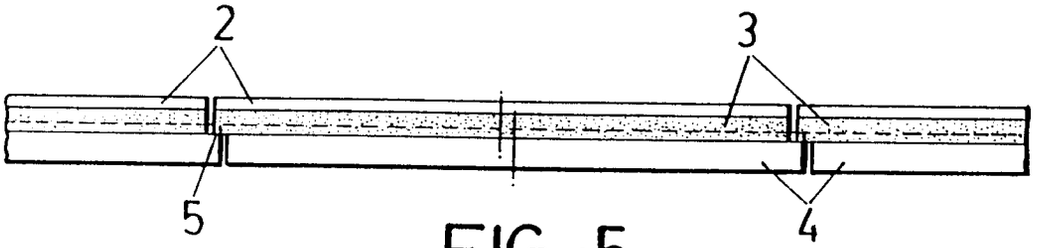

FIG.-5

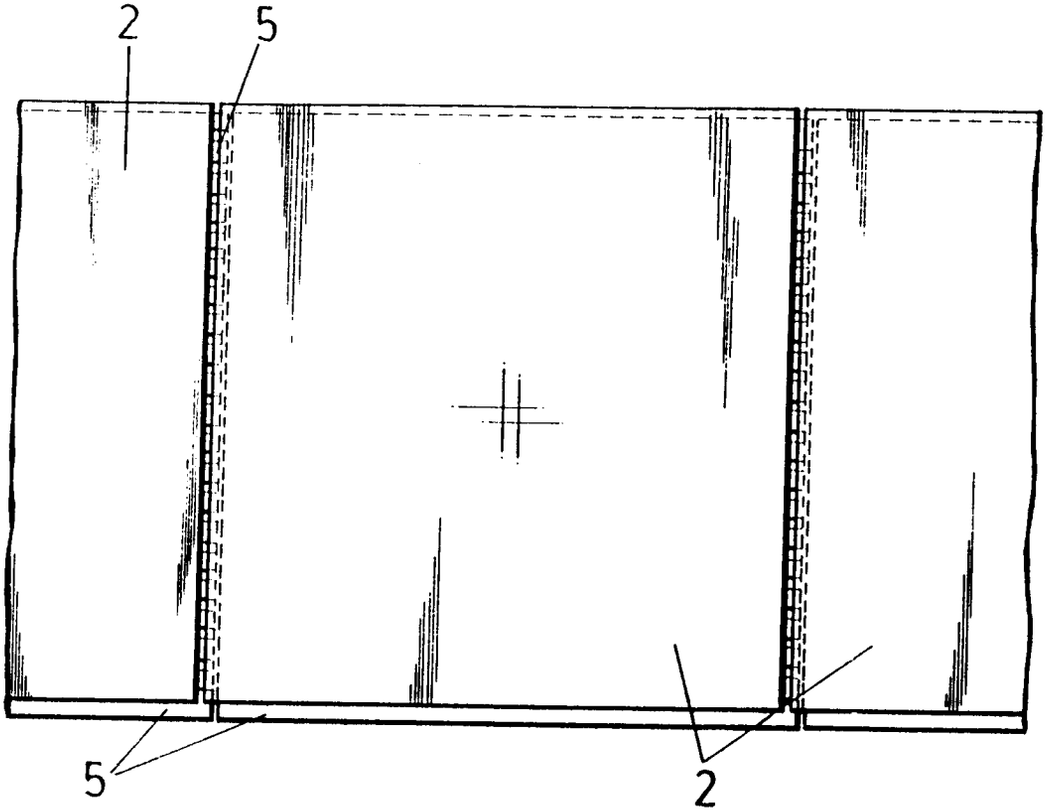

FIG.-6

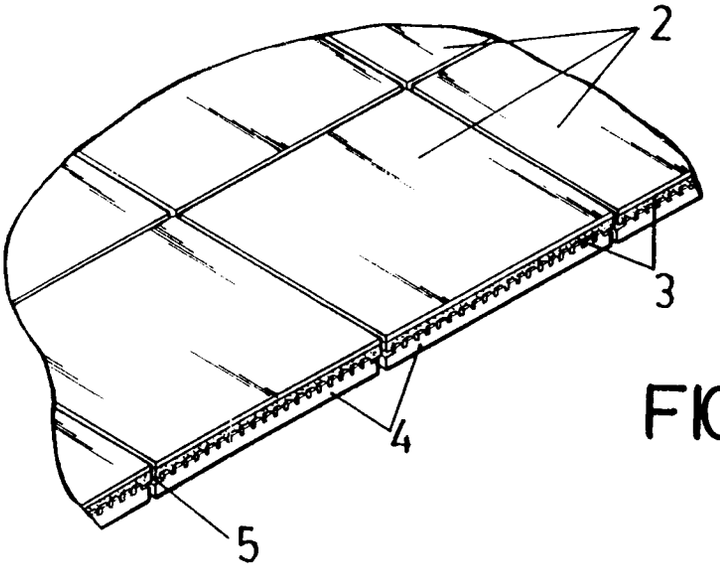

FIG.-7

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EUROPEAN SEARCH REPORT

Application Number

EP 90 50 0077

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-4 469 731 (SARACINO) * Abstract; column 5, lines 1-35; figures 1-4 *	1	E 04 D 3/35 E 04 D 11/00
A	EP-A-0 088 198 (J.C. DEPPEN) * Page 5, line 3 - page 7, line 16; page 9, lines 18-22; figures 1-5 *	1	
A	FR-A-2 485 065 (H. CHIODI) * Whole document *	1	
A	FR-A-1 472 644 (ICI) * Page 2, column 1, lines 26-51; figures 1-3 *	1	
A	FR-A-2 086 343 (FENISA S.A.) * Page 2, lines 27-38; figures 1-5 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 04 D
E 01 C

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	13 February 91	RIGHETTI R.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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