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(54) **Composite reflector**

(57) A composite reflector (100) for a traffic guiding means such as a guard rail, a concrete step barrier, a traffic delineator or the like is provided. In order to obtain a reflector for traffic guidance means which provides for easy application and which increases road safety, a first reflective layer (10), a second reflective layer (20), a first reinforcement layer (30), a second reinforcement layer (40), a double-sided adhesive tape (50), and at least one double-sided pressure sensitive adhesive tape (60) are provided, wherein the composite reflector (100) is essentially T-shaped, the crossbeam of the T forming a mounting section (110) and the middle beam of the T forming a protruding section (120).

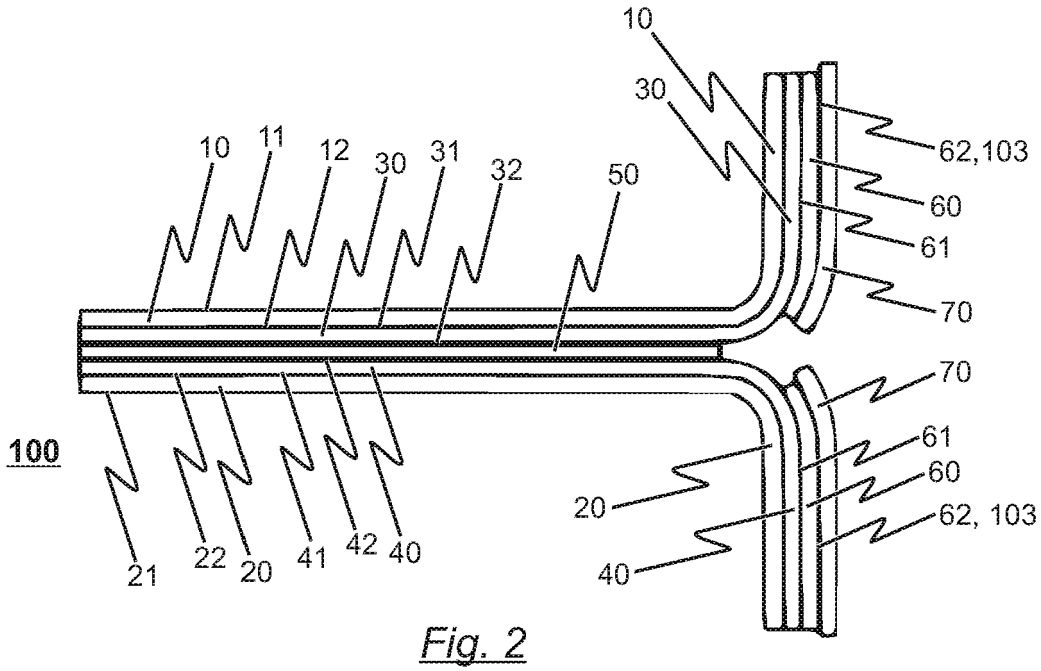

Fig. 2

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Description

[0001] The invention relates to a composite reflector designed and constructed to be mounted on a guard rail, a concrete step barrier, a traffic delineator or the like.

[0002] Traffic guidance means such as guard rails or concrete step barriers are equipped with reflectors in order to improve the visibility of the road boundaries during dawn and at night. Conventional reflectors for traffic guiding means comprise a solid backside, such as a steel backing, and a solid reflective shield mounted thereon. The solid reflective shield is made of a hard plastic, metal or glass material, and the conventional reflector is mounted with its backside onto the traffic guiding means, for example a steel guard rail, by means of, e.g., steel bolts or iron nails.

[0003] If a conventional reflector is to be mounted onto a different kind of traffic guiding means consisting of a different material, the fastening means has to be adapted to the respective material. In other words, mounting the conventional reflector onto a concrete barrier may require a fastening means different from the one suitable for mounting it onto a steel surface of a guard rail.

[0004] Also, while solid concrete barriers may comprise walls which are not entirely vertical, but extending from the ground at varying slopes, the recess of a guard rail in which conventional reflectors are mounted is usually of a curved shape.

[0005] Due to those different slopes and shapes, the backside of the reflector, such as a steel backing, may require adaption to those shapes in order to meet reflection angle requirements or the like. However, the shapes of the steel backings of those conventional reflectors are pre-manufactured, such that an adaption at the mounting location is not easily possible. Moreover, the pre-manufacturing of the parts usually has to be performed on special machines or with special tools, making an adaption at the manufacturing location expensive and complex.

[0006] Furthermore, the solid reflective shields of the conventional reflectors may break upon traffic impact, leading to additional vehicle damages as well as injuries for example of motorcyclists. In addition, conventional reflectors broken upon traffic impact do no longer contribute to visual safety. Therefore, conventional reflectors are usually hidden in the recess of the guard rails and do not protrude in a noteworthy manner in the direction of the lane, such that the risk of traffic impact is minimized. However, this minimizes the reflective area and does not allow for any enlargement, and especially in curves and bends, a larger reflective area would be desirable.

[0007] With respect to those problems in the prior-art, the object of the invention was to alleviate the disadvantages of the prior-art solutions, in particular by providing a reflector for traffic guidance means which provides for easy application and which increases road safety.

[0008] In accordance with the current invention, this problem is solved by providing a composite reflector according to claim 1. This problem is particularly solved by providing a composite reflector comprising a first and a second reflective layer, a first and a second reinforcement layer, and a first double-sided adhesive tape. Preferably, the inventive composite reflector further comprises at least one second double-sided adhesive tape, wherein this at least one second double-sided adhesive tape comprises at least one pressure sensitive adhesive surface. The inventive composite reflector is essentially T-shaped, wherein the "upper" beam, i.e. the crossbeam, of the T forms a mounting section and wherein the beam ascending to the centre of the crossbeam forms a protruding reflective section.

[0009] The advantages of the solution in accordance with the invention over the prior-art solutions are evident.

[0010] Manufacturing of the composite reflector is inexpensive, such that shape and dimensions can easily and inexpensively be varied depending on the area of usage, i.e. the recess of guard rails, the side walls of concrete roadblocks, even curved concrete roadblocks, delineators etc.

[0011] Since the reflective layers extend partially along the extension direction of the traffic guidance means, namely along the mounting section of the composite reflector, but extend also partially into a different direction, namely along the protruding section of the composite reflector, the reflective angle and therefore their visibility is increased, enhancing the road safety.

[0012] The composite reflector is mounted on the surface of the traffic guidance means by adhesion. This allows for easy application to different kinds of surfaces, such as concrete or steel, without the need of any further fixation tools, for example battery-supplied tools. Furthermore, the mounting time is massively reduced. Moreover, no holes need to be drilled to steel guard rails, for example, which reduces the risk of corrosion at the mounting site. Also, upon renewal of a composite reflector, the time for remounting is reduced since the old one only needs to be pulled of the mounting site.

[0013] All the layers are at least partially flexible in the sense of a tape-like material, such that the composite reflector will not break and split upon traffic impact. This reduces the risk for vehicle damage as well as injuries and ensures that its visible guidance functions are sustained.

[0014] Since the composite reflector is not limited in its dimensions, it can easily be customized for the specific needs at the mounting location. For example, in areas with a high risk of accidents, the dimensions may be increased. Also, the shape may be completely customized according to the needs at the mounting location.

[0015] Since the weight of the inventive composite reflector is approximately 20% less than the weight of conventional reflectors with respect to the useable reflective are, even if the inventive composite reflector is forcibly disassembled and detached from its mounting surface during an accident, its impact on vehicles and persons is reduced when catapulted onto them.

[0016] Furthermore, many reflective colours are pos-

sible for the first and the second reflective layer, and even different colours for the different directions may be applied. Therefore, it is easily possible to point out a special attention area of the road or the like.

[0017] Advantageous embodiments are indicated in the sub-claims.

[0018] The pressure sensitive adhesive surface of the at least one second double-sided adhesive tape may comprise an adhesive adapted to the climate conditions at site. Preferably, the pressure sensitive adhesive surface comprises a weather-resistant adhesive. This weather-resistant adhesive is adapted to the climate conditions at the assembly location. Thus, a consistent and durable mounting of the composite reflector is ensured.

[0019] Further, the weather-resistant adhesive may be a butyl adhesive. By providing a butyl adhesive, an improved consistent and durable mounting of the composite reflector on different materials, e.g. on steel and likewise on concrete surfaces, is ensured. However, the weather-resistant adhesive is not limited to a butyl adhesive, but may be adapted to the specific conditions at the mounting side. Beside butyl adhesive, and depending on the conditions, such as climate conditions, at the mounting site, the weather-resistant adhesive may consist of, but is not limited to, an acrylic adhesive, a rubber-based adhesive or a silicon-based adhesive.

[0020] Preferably, in order to ease the production of the composite reflector and to provide for an enhanced adoption to the climate conditions at site, also the first double-sided adhesive tape may comprise a pressure sensitive adhesive, which can be a weather-resistant adhesive such as a butyl tape. In this case, only one kind of double-sided adhesive tape is needed for the assembly of the composite reflector, i.e. the same kind of pressure-sensitive double-sided adhesive is used both for the first double-sided adhesive tape and also for the at least one second double-sided adhesive tape.

[0021] Also, the mounting section of the composite reflector can be made flexible in a manner such that a mounting on an uneven surface is possible. This allows for easy and reliable adoption to the special shapes of the surfaces, for example, the recess of a guard barrier.

[0022] Preferably, the first reinforcement layer and the second reinforcement layer are made of a transparent film material, at this point chosen is polyester but not limited to any other transparent filmic material. This allows for an easy fixation of a desired angle between the protruding area and the mounting area, for example at approximately 90 degrees. The fixation of a correct angle improves visibility in bends and curves or on slopes, for example.

[0023] More preferably, the first reinforcement layer and the second reinforcement layer are of a sufficient thickness such as to provide an effective stiffness-to-weight ratio. The thickness is sufficient to secure the shape of the composite reflector and is, for example, but not limited to, a thickness of approximately 175 μm.

[0024] Also, the composite reflector may be assembled such that the mounting section and the protruding section extend in directions essentially perpendicular to each other. This provides for an evenly distributed visibility for vehicles from one direction as well as the opposite direction.

[0025] Preferably, the protruding section is constructed to be flexible in order to allow a bending relative to the mounting section and an autonomous return into its original position. By providing a relative flexibility between the mounting section and the protruding section, an occasional traffic impact, for example due to enlarged reflector dimensions in bends or the like, only bends the composite reflector back and forth without deforming it permanently. Thereby the road safety is sustained.

[0026] Even more preferably, a transition area between the mounting section and the protruding section may be smoothly bent from the extension direction of the mounting section to the desired extension direction of the protruding section. By avoiding a very steep angle between the sections, light from different directions may be reflected, allowing for a reflection even when the composite reflector is illuminated from an exceptional angle. This improves road safety even further.

[0027] Of course, the inventive composite reflector is not limited to be mounted on guard rails or concrete step barriers, but also to house walls, fences or the like; in other words, to any fixed object along whose extension direction a passive visual guidance is desired.

[0028] The invention will now be further described by way of exemplary embodiments with reference to the accompanying drawings in which:

Fig. 1 shows a schematic perspective view of a composite reflector according to an exemplary embodiment of the invention; and

Fig. 2 shows a sectional schematic view of the composite reflector of Fig. 1.

[0029] Like reference numerals indicate like functions.

[0030] Figs. 1 and 2 both show schematic views of a composite reflector 100 comprising a first reflective layer 10 and a second reflective layer 20. The first surface 11 of the first reflective layer 10 and the first surface 21 of the second reflective layer 20 form a first outer surface 101 and a second outer surface 102 of the composite reflector, respectively.

[0031] The first reflective layer 10 is bonded with its second surface 12 to the first surface 31 of a first reinforcement layer 30. Likewise, the second reflective layer 20 is bonded with its second surface 22 to the first surface 41 of a first reinforcement layer 40.

[0032] The composite reflector 100 essentially resembles the shape of a T, wherein the crossbeam of the T forms a mounting section 110. A transition area 115 adjoins to approximately the centre of the mounting section 110, leading over into a protruding section 120 of the composite reflector 100.

[0033] In the protruding section 120, in between the reinforcement layers 30, 40 and bonded with their respective second surfaces 32, 42, a first double-sided adhesive tape 50 is provided.

[0034] In the mounting section 110, a second double-sided adhesive tape 60 is bonded with its first adhesive surface 61 to the bent-over second surface 32 of the first reinforcement layer 30. Likewise, another second double-sided adhesive tape 60 is bonded with its first adhesive surface 61 to the bent-over second surface 42 of the second reinforcement layer 40.

[0035] A second adhesive surface 62 of the second double-sided adhesive tape 60 forms a mounting surface 103 of the composite reflector 100 along the crossbeam of the T-shape, allowing it to be mounted, due to the flexibility of all the layers 10, 20, 30, 40, 50, 60, even to an uneven surface without any tools, wherein the surface material may be as open-porous as concrete or as solid as metal. In the exemplary embodiments of Figs. 1 and 2, the respective second adhesive surface 62 of both of the second double-sided adhesive tapes 60 comprises a pressure-sensitive adhesive.

List of reference signs

[0036]

10 first reflective layer

11 first surface of the first reflective layer

12 second surface of the first reflective layer

20 second reflective layer

21 first surface of the second reflective layer

22 second surface of the second reflective layer

30 first reinforcement layer

31 first surface of the first reinforcement layer

32 second surface of the first reinforcement layer

40 second reinforcement layer

41 first surface of the second reinforcement layer

42 second surface of the second reinforcement layer

50 first double-sided adhesive tape

60 second double-sided adhesive tape

61 first adhesive surface of the second double-sided adhesive tape

62 second adhesive surface of the second double-sided adhesive tape

70 liner paper

100 composite reflector

101 first outer surface of the composite reflector

102 second outer surface of the composite reflector

103 mounting surface of the composite reflector

110 mounting section

115 transition area

120 protruding section

Claims

1. Composite reflector (100) for a traffic guiding means such as a guard rail, a concrete step barrier, a traffic delineator or the like, the composite reflector (100) comprising:

- at least one reflective layer (10, 20), wherein the at least one reflective layer (10, 20) comprises a first surface (11, 21) forming an outer surface (101, 102) of the composite reflector (100) and a second surface (12, 22) opposite to the first surface (11, 21), and
- at least one reinforcement layer (30, 40), wherein the at least one reinforcement layer (30, 40) comprises a first surface (31, 41) bonded to the second surface (12, 22) of the at least one reflective layer (10, 20) and a second surface (32, 42) opposite to the first surface (31, 41)

wherein the composite reflector (100) is essentially T-shaped, the crossbeam of the T forming a mounting section (110) and the middle beam of the T forming a protruding section (120).

2. The composite reflector (100) according to claim 1, wherein the at least one reflective layer (10, 20) is at least partially flexible and/or wherein the at least one reinforcement layer (30, 40) is at least partially flexible.

3. The composite reflector (100) according to claim 1 or 2,
further comprising a first double-sided adhesive tape (50),
wherein the second surface (32, 42) of the at least one reinforcement layer (30, 40) are bonded together along the protruding section (120) by the first double-

sided adhesive tape (50).

4. The composite reflector (100) according to one of the claims 1 to 3, further comprising at least one second double-sided adhesive tape (60) which comprises a first adhesive surface (61) and a second adhesive surface (62),
wherein the second surface (32, 42) of the at least one reinforcement layer (30, 40) is equipped with the first adhesive surface (61) of the at least one second pressure sensitive adhesive tape (60) along the mounting section (110) such that the second adhesive surface (62) of the at least one second double-sided adhesive tape (60) forms a mounting surface (103) of the composite reflector (100).

5. The composite reflector (100) according to claim 4, wherein at least one surface of the first double-sided adhesive tape (50) comprises a pressure-sensitive adhesive and/or wherein at least one of the first adhesive surface (61) or the second adhesive surface (62) of the at least one second double-sided adhesive tape (60) comprise a pressure-sensitive adhesive.

6. The composite reflector (100) according to any of claims 3 to 5,
wherein the at least one second double-sided adhesive tape (60) is at least partially flexible and/or wherein the first double-sided adhesive tape (50) is at least partially flexible.

7. The composite reflector (100) according to one of the claims 1 to 6, wherein the composite reflector (100) comprises:

- a first reflective layer (10) comprising a first surface (11) forming a first outer surface (101) of the composite reflector (100) and a second surface (12) opposite to the first surface (11),
- a second reflective layer (20) comprising a first surface (21) forming a second outer surface (102) of the composite reflector (100) and a second surface (22),
- a first reinforcement layer (30) comprising a first surface (31) bonded to the second surface of the first reflective layer (10) and a second surface (32) opposite to the first surface (31),
- a second reinforcement layer (40) comprising a first surface (41) bonded to the second surface of the second reflective layer (20) and a second surface (42) opposite to the first surface (41),
- a first double-sided adhesive tape (50), wherein the second surface (32) of the first reinforcement layer (30) and the second surface (42) of the second reinforcement layer (40) are bonded together along the protruding section (120) by the first double-sided adhesive tape (50), and
- at least one second double-sided adhesive tape (60) comprising a first adhesive surface (61), and a second adhesive surface (62),

wherein the second surface (32) of the first reinforcement layer (30) and the second surface (42) of the second reinforcement layer (40) are equipped with the first adhesive surface (61) of the at least one second double-sided adhesive tape (60) along the mounting section (110) such that the second adhesive surface (62) of the at least one second double-sided adhesive tape (60) forms a mounting surface (103) of the composite reflector (100).

8. The composite reflector (100) according to one of the claims 4 to 7, wherein the second adhesive surface (62) comprises an adhesive adopted to the climate conditions at a mounting site.

9. The composite reflector (100) according to claim 8, wherein the adhesive adopted to the climate conditions at a mounting site is one of a butyl adhesive, an acrylic adhesive, a rubber-based adhesive or a silicon-based adhesive.

10. The composite reflector (100) according to one of the claims 1 to 9, wherein the mounting section (110) is constructed to be flexible such that a mounting on an uneven surface is possible.

11. The composite reflector (100) according to one of the claims 1 to 10, wherein the at least one reinforcement layer (30, 40) is made of a transparent film material, preferably but not limited to a polyester film material.

12. The composite reflector (100) according to one of the claims 1 to 11, wherein the at least one reinforcement layer (30, 40) is of a sufficient thickness in order to secure the shape of the composite reflector (100), preferably of approximately 175 μm.

13. The composite reflector (100) according to one of the claims 1 to 12, wherein the mounting section (110) and the protruding section (120) extend in directions essentially perpendicular to each other.

14. The composite reflector (100) according to one of the claims 1 to 13, wherein the protruding section (120) is constructed to be flexible in order to allow a bending relative to the mounting section (110) and an autonomous return into its original position.

15. The composite reflector (100) according to one of the claims 1 to 14, wherein a transition area between the mounting section (110) and the protruding section (120) on the first outer surface (101) of the composite reflector (100) and/or a transition area be-

tween the mounting section (110) and the protruding section (120) on the second outer surface (102) of the composite is smoothly bent allowing for a curved transition between the mounting section (110) and the protruding section (120).

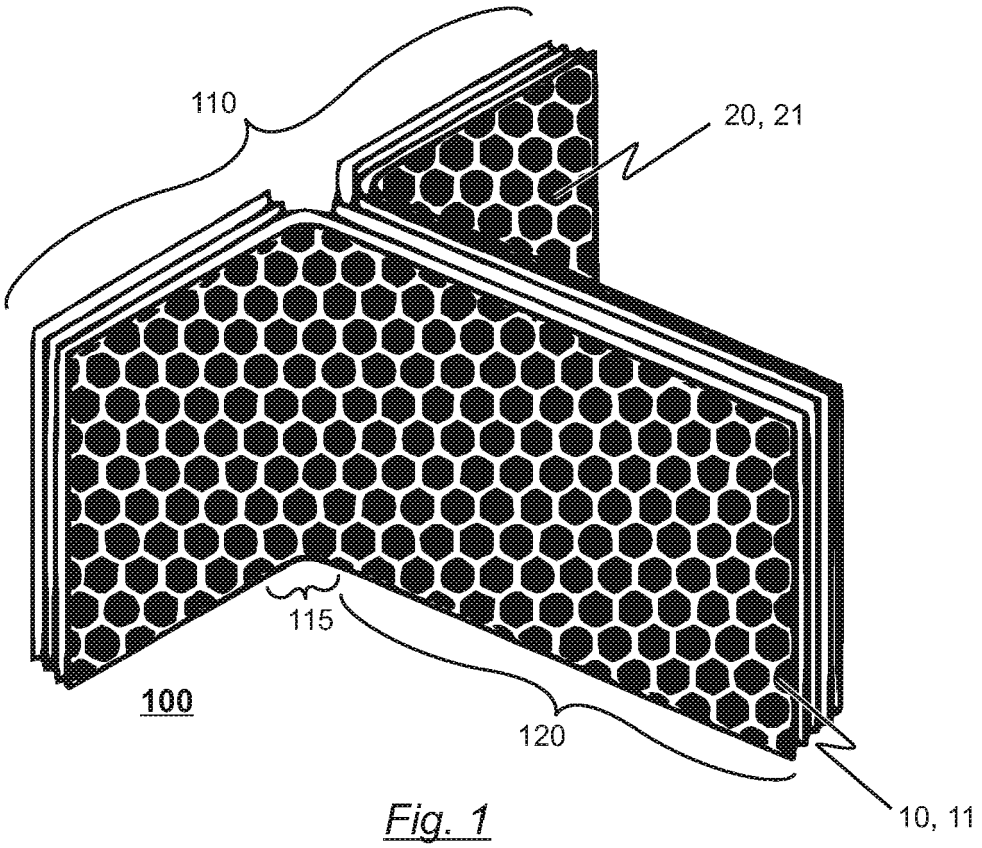
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Fig. 1

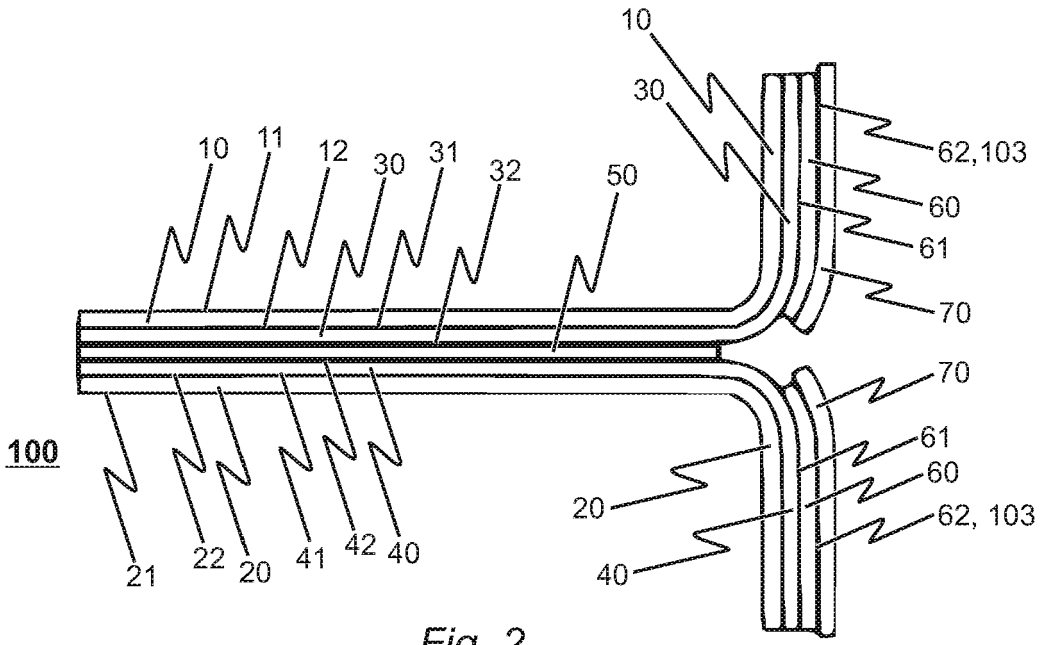
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Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 11 17 4106

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 December 2011	Flores Hokkanen, P

CATEGORY OF CITED DOCUMENTS

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