(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 792 902 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.03.2021 Bulletin 2021/11

(21) Application number: **20194701.7**

(22) Date of filing: **04.09.2020**

(51) Int Cl.:
G09F 7/00 *(2006.01)* ***G09F 7/16*** *(2006.01)*
G09F 15/00 *(2006.01)* ***G09F 19/22*** *(2006.01)*
G09F 7/18 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **12.09.2019 CH 11482019**

(71) Applicant: **Poslovne storitive Corsulting & Trading Marcello Pinzo**
6310 Isola (SI)

(72) Inventor: **Pinzo, Marcello**
6310 Isola (SI)

(74) Representative: **Negrini, Elena**
Agazzani & Associati S.r.l.
Via dell'Angelo Custode 11/6
40141 Bologna (IT)

(54) **SIGNPOST FOR ROAD OR ADVERTISING SIGNS AND METHOD OF CARRYING OUT**

(57) A signpost for road or advertising signs comprises at least one panel (13), having two opposite surfaces (13a, 13b), at least one of said opposite surfaces (13a, 13b) having at least one informative portion (15) carrying road and/or advertising signs, in which said panel (13) comprises a plurality of openings for allowing the air passage, in which said at least one informative portion (15) comprises at least one layer of reflective paint which defines said road and/or advertising signs.

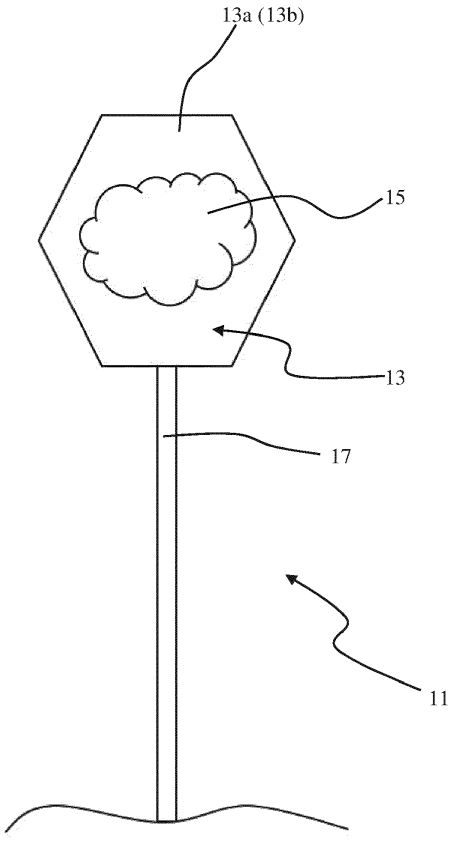

Fig. 1

EP 3 792 902 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a signpost for road or advertising signs. The invention also concerns a method of carrying out said signpost. In particular, but not exclusively, the sign according to the invention is likely to be installed in areas subject to strong winds. Preferably, the present invention finds application in the road sign sector, more preferably in vertical signage, but it can also find application in the advertising sector.

PRIOR ART

[0002] A signpost is a device assigned to indicate a direction, a warning, an indication to the drivers of the vehicles moving along and to any other road user, or to provide advertising information. Such devices basically consist of a plate, made of sheet metal, generally flat, having variable shape and size depending on use.

[0003] A decorative film is generally applied to the surface of one of the sign plate's faces, typically provided of particular chromatic and luminance characteristics, to ensure good visibility during both night and day. The decorative film reports the direction, warning, indication or a series of advertising information, or a combination of them, which must be visible to drivers of transiting vehicles and, more generally, to every street.

[0004] As known, the signposts can be permanent, with the signpost being generally supported by a metal pole and positioned on one side of the road or anchored to a support structure above the roadway, or temporary, with the signpost being suitable for providing information such as the presence of a road construction site, an accident, etc., where the signs are generally supported by proper removable support structures.

[0005] A problem with known signposts lies in the fact that, in areas subject to strong winds, such as coastal or mountain areas, said signs, under the influence of a strong wind, can fall onto part of the carriageway addressed for traffic or even can be torn by the wind force and carried along the carriageway. This puts at risk the safety of road users who may be involved in accidents.

[0006] This problem is even more evident in road construction where, for example, to indicate the presence of a construction site, temporary signs are used, which can be moved by the wind forces and cause hindrance to the vehicle passages, thus causing inconveniences in terms of road safety. All this, in addition to constituting a problem in terms of road safety, represents a considerable cost for the companies and bodies that manage the maintenance of such signposts.

[0007] Therefore, there is the need to solve the aforementioned problem of how to mitigate the wind thrust on the warning sign's surface, in order to guarantee the safety of road users and prevent accidents from happening.

[0008] Examples of road signs suitable for areas subject to strong winds are described in JP03200093 (U), CN208250956 (U) and KR101886617 (B1). JP03200093 (U) and CN208250956 (U) describe road signs equipped with holes for the passage of air, while KR101886617 (B1) describes a road signpost carried out with a plurality of adjacent and inclined sheet metal strips to ensure a good visibility of the sign to the road users.

[0009] However, the known signposts, conceived for areas subject to strong winds, have a series of drawbacks.

[0010] A first drawback of the known signs of the mentioned type derives from the degradation of the image quality, in particular when observed from a close distance, due to the perforated surface.

[0011] A further drawback lies in the difficulty of application, on a previously perforated surface, of the decorative film that shows the information of interest that must be displayed.

[0012] Moreover, even if the perforation should occur after the application of the film, there is still the risk that the hole drilling causes the loss of information due to the material removal at the holes of the sheet.

DISCLOSURE OF THE INVENTION

[0013] A first purpose of the invention is to provide a signpost, structured in such a way as to mitigate the wind thrust on the surface of the sign, which does not have the drawbacks of the known art.

[0014] A further purpose of the invention is to provide a sign having a good visibility of the information reported, at different angles and distances and both during the day and at night.

[0015] Another purpose of the invention is to provide a signpost in which the effect of image quality degradation, due to the measures adopted to adapt the post to the presence of strong winds, is substantially absent.

[0016] Another purpose of the invention is to provide a signpost that can be used both in road signs and in advertising.

[0017] Another purpose of the invention is to provide a weatherproof signpost.

[0018] Last but not least, a purpose of the invention is to provide a signpost that can be industrially produced at advantageous costs.

[0019] These and other purposes are achieved with the signpost, as claimed in the attached claims.

[0020] The signpost according to the invention includes at least one substantially flat panel, of geometrical shape suitable for the purpose, having two opposite surfaces, at least one of which having at least one informative portion carrying information such as for example road directions and/or advertising information. Preferably, the at least one informative portion carrying road directions and/or advertising information is carried out by applying at least one layer of reflective paint to the panel surface.

[0021] According to the invention, advantageously, a reflective paint suitable for the purpose is a polyester-

based powder paint with particle size suitable for electrostatic application and formulated for application on aluminium for architecture and galvanised steel. Preferably, the paint used to make the reflective layer is classified in family I - class 6c in compliance with the NFT36-005 regulation. The gloss range of the paint, measured according to EN ISO 2813 regulation at 60° is preferably between 85 and 95 gloss units.

[0022] Preferably, still according to the invention, it is necessary to carry out a pre-treatment step of the surface to be painted before applying the paint. Aluminium supports, for example, preferably require a multi-stage chromating treatment or alternatively an appropriate chrome-free pre-treatment or even a pre-anodization for a suitable preparation and conditioning of the substrate. Advantageously, for signs used in outdoor environments, the application of the paint is preferably preceded by the deposition of an anti-corrosive "primer".

[0023] According to a preferred embodiment of the invention, the reflective paint layer thickness is not less than 65 μm.

[0024] Thanks to the chromatic and luminance properties of the reflective paint, the visibility of the road sign is guaranteed both day and night. Advantageously, the panel has a plurality of openings allowing the air passage, so that when the signpost according to the invention is used in areas subjected to strong wind gusts, it has the least possible resistance to wind pressure.

[0025] Preferably, the openings provided on the signpost panel are arranged in such a way as to form a net structure.

[0026] Preferably, according to the invention, the panel comprises an aluminium sheet, but may also include a steel sheet or other type of suitable material.

[0027] More preferably, the panel comprises an expanded metal sheet, i.e. a sheet produced by known means and methods, such as for example a cold-pressing operation applied to a sheet coming from webs and/or foils.

[0028] In particular, by means of this known manufacturing process, the sheet is simultaneously cut and stretched, creating a sort of pattern, allowing to obtain the aforementioned net structure defined by the plurality of openings, without material waste. Preferably, the at least one signpost panel according to the invention comprises an expanded metal sheet with a rhomboidal pattern, i.e. the plurality of openings have a rhomboidal shape. By means of this sheet manufacturing process, different types of openings can be obtained, consequently different patterns such as a square, hexagonal one, or more complex patterns in order to achieve the desired effect in terms of the signpost visibility.

[0029] An expanded metal sheet for making the signpost according to the invention can be advantageously carried out, for example by making transverse cuts into the sheet metal and at the same time exerting on the sheet a traction normal to the cut direction so as to obtain a grid that is generally arranged in rhomboidal meshes.

[0030] Preferably, the sum of the openings areas corresponds to about one third of the overall panel surface. Furthermore, the diameter of the circumference inscribed at each of the rhomboid-shaped openings is preferably comprised between 10 mm and 15 mm.

[0031] Advantageously, still according to the invention, the combination of the expanded metal sheet combined with the reflective paint determines a light intensity areal coefficient that is never lower, for the various colours and the various divergence and illumination angles, to the values prescribed by the UNI EN regulations for road signs.

[0032] Advantageously, according to the invention, the panel surface not affected by the openings has a plurality of relief shapes, for example obtained by laser processing or pressing, which allow minimizing the image quality degradation expected in the informative portion, due to the "pixel" effect created by the plurality of openings.

[0033] Preferably, according to the invention, the relief shapes plurality, provided on the surface of the panel not affected by holes, consists of a series of trihedron micro prisms that allow exploiting the light reflection angles coming from a vehicle headlight in transit on the road adjacent to the signpost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] Some embodiments of the invention will be described by way of non-limiting example with reference to the attached figures in which:

- Fig. 1 is a schematic front view of a signpost according to the invention;
- Fig. 2 is an enlarged plan view of a portion of the signpost of Fig. 1;
- Fig. 3 is a sectional view along line A-A of the portion of the signpost of Fig.2;
- Fig. 4 is an enlarged view of a detail of the surface of the informative portion, not affected by the plurality of openings;
- Fig. 5 is a schematic view of a road installation of a signpost according to the invention.

BEST MODE TO CARRY OUT THE INVENTION

[0035] With reference to Fig. 1, a preferred embodiment of a signpost according to the invention, which has been referred to as a whole with reference 11, is illustrated.

[0036] The signpost 11 according to the invention comprises a panel 13 which, in the illustrated embodiment, has a hexagonal shape.

[0037] In other embodiments the panel 13 can assume a triangular, circular, rectangular, arrow shape or still other shapes, depending on the type of signal or information to be displayed. The panel 13 has two opposite surfaces 13a, 13b, at least one of which having at least one informative portion 15 carrying information such as for ex-

ample road directions and/or advertising information. Advantageously, the at least one portion 15, carrying information such as for example road directions and/or advertising information, is defined by the application of at least one layer of reflective paint which ensures good visibility of the sign both during the day and at night.

[0038] Preferably, the paint used is an electrostatic application powder paint and is applied to the surface 13a of the panel 13 by known methods and means such as for example by using electrostatic guns for spray applications, manual or automatic, or by means of a triboelectric system. In the embodiment illustrated by way of example, the panel 13 is supported by a pole 17 which will then be positioned on the roadside or in any case in a position which ensures good visibility of the signpost 11 for road users.

[0039] In other embodiments, the panel 13 can be anchored by means of a support structure above the roadway, or supported by suitable structures when said signpost 11 is a temporary signpost able to provide information such as the presence of a road construction site, an accident, etc. In the illustrated embodiment, the panel 13 comprises a sheet, preferably aluminium made. In other embodiments, the sheet can be made of steel or other suitable material.

[0040] Advantageously, the panel 13 has a plurality of openings that allow the air passage, thus mitigating the wind thrust on the surfaces 13a, 13b of the panel 13. Referring now to Figs. 2-4, a detail view of sheet 21, used for the construction of the panel 13 of the signpost 11, is illustrated. In the illustrated embodiment, the sheet 21 used for the construction of the panel 13 is an expanded aluminium sheet, that is, a sheet obtained by means of a manufacturing process, in which a webs and/or foils sheet is preferably simultaneously cut and stretched, so as to obtain a sheet 21 equipped with a plurality of openings 23.

[0041] In the illustrated embodiment, the openings 23 have a rhombus shape and are arranged in such a way as to define a net structure, thus defining a rhomboidal pattern obtained through a rhomboidal mesh applied in the manufacturing process of the sheet 21. In other embodiments, the openings can have different shapes, such as square, circular, or other shapes depending on the type of mesh used in the sheet manufacturing process.

[0042] According to the invention, the diameter "Df" corresponding to the diameter of the circumference inscribed in the rhomboid-shaped openings 23, is preferably comprised between 10 mm and 15 mm, more preferably between 12 mm and 13 mm. Preferably, each of the rhomboid-shaped openings 23 is surrounded by a rhomboid net mesh whose perimeter has a long diagonal "DL" ranging between 25 mm and 30 mm and a short diagonal "DC" ranging between 11 mm and 17 mm.

[0043] At the beginning of the processing, that is before being subjected to a cutting and stretching process, the sheet has a thickness "SP" comprised between 1 mm and 3 mm, while the sheet 21, i.e. the sheet obtained with the cutting and stretching process has a final thickness "SPf" preferably comprised between 3 mm and 6 mm. The sheet 21, obtained after the cutting and stretching process of a sheet metal coming from webs or foils, has a surface 25 which defines an advancement "AV", that is substantially the width of the meshes surrounding the openings 23, preferably comprised between 4 mm and 6 mm due to the stretching process of the sheet used, that is to the elongation process of said sheet used. The areas sum of the openings 23 corresponds, in the example shown, to at least one third of the panel 13 overall surface.

[0044] With reference to Figs. 4 and 5, advantageously, the surface 25 of the informative portion 15, not affected by the openings 23 of the sheet 21, has a plurality of relief shapes 31 which allow minimizing the image quality degradation due to the "pixel effect" created by the plurality of openings 23. A detail view of the surface 25 of the sheet 21 is illustrated in Fig. 4.

[0045] In this preferred embodiment, the plurality of relief shapes 31 provided on the surface 25 not affected by holes in the sheet 21, comprises a series of trihedron micro-prisms that allow exploiting the light reflection angle coming from the headlights 37 of a passing vehicle 39. Thanks to the presence of the relief shapes, a light beam 33 coming from the headlights 37 of a vehicle 39 and incident onto the panel 13 is substantially reflected in the same direction 35 of origin, i.e. towards the vehicle 39, in such a way as to increase visibility and readability of the information contained in the signpost 11.

[0046] In the scheme shown in Fig. 5 the divergence angle "a", i.e. the angle defined by the light beam 33 on the surface 13a of the panel 13, coming from the headlights 37 of a vehicle 39, and from the straight line 35 that connects the incidence point 45 with the observation point 41, this angle ("a") can vary between 2° and 15°, according to the distance between the vehicle 39 and the signpost 11. Furthermore, the incidence angle "b", i.e. the angle defined between the incident light beam 33 and a direction 43 perpendicular to the surface 13a of the panel 13, is between 5° and 40°.

[0047] The invention as described and illustrated is susceptible to numerous variations and modifications, falling within the same inventive principle.

Claims

1. Signpost for road or advertising signs comprising at least one panel (13), having two opposite surfaces (13a, 13b), at least one of said opposite surfaces (13a, 13b) having at least an informative portion (15) carrying road and/or advertising signs, in which said panel (13) comprises a plurality of openings (23) to allow the air passage, **characterized in that** said at least one informative portion (15) comprises at least one layer of reflective paint which defines said road and/or advertising signs.

2. Signpost according to claim 1, **characterized in that** said openings (23) define a net structure.

3. Signpost according to claim 1 or 2, **characterized in that** said openings (23) have a rhomboidal shape.

4. Signpost according to claim 3, **characterized in that** the diameter (Df) corresponding to the circumference inscribed in the rhomboid-shaped openings (23) is between 10 mm and 15 mm.

5. Signpost according to any of the preceding claims, **characterized in that** said panel (13) comprises an expanded sheet (21).

6. Signpost according to claim 5, **characterized in that** the surface (25) of said informative portion (15), not affected by the openings (23) in the sheet (21), has a plurality of relief shapes (31).

7. Signpost according to claim 6, **characterized in that** the plurality of relief shapes (31) includes trihedron micro-prisms.

8. Signpost according to any of the preceding claims, **characterized in that** the sum of the areas of the openings (23) corresponds to at least one third of the overall surface of the panel (13).

9. Method for carrying out a signpost according to any one of claims 1-8, **characterized in that** said openings (23) are obtained by means of a cutting and stretching process of a sheet metal into webs and/or foils.

10. Method according to claim 9, **characterized in that** the surface (25) of said informative portion, not affected by the openings (23) in the sheet (21), has a plurality of relief shapes (31) and **in that** said plurality of relief shapes is obtained by laser processing and/or pressing.

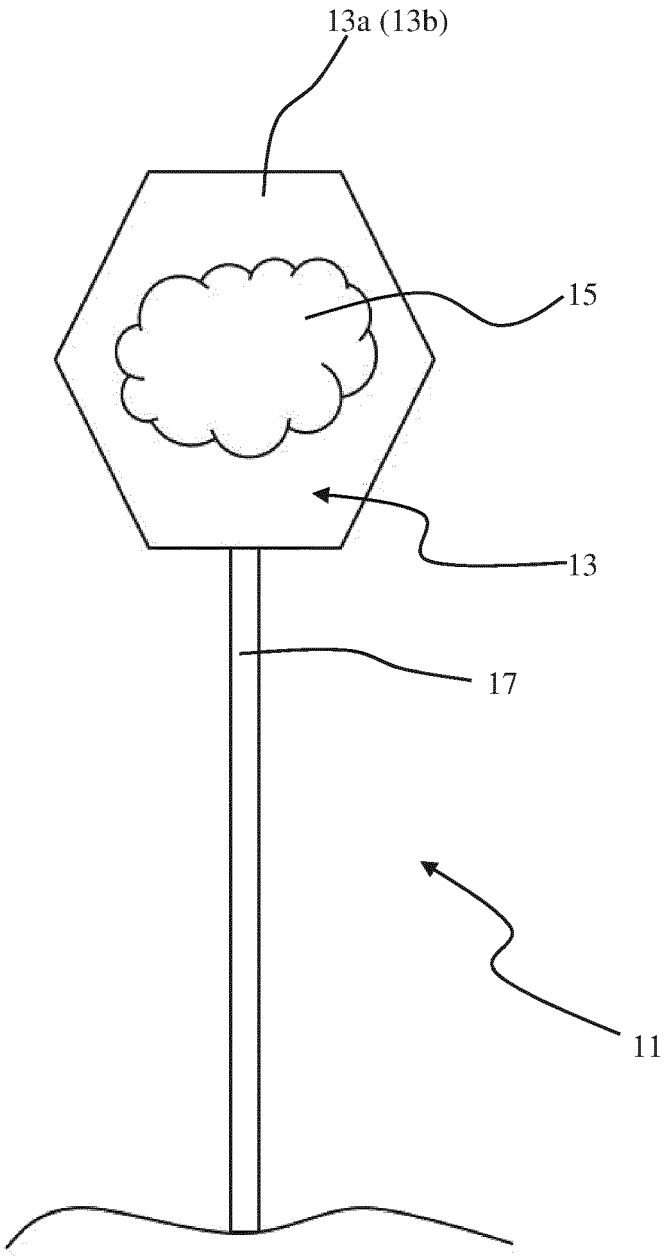

Fig. 1

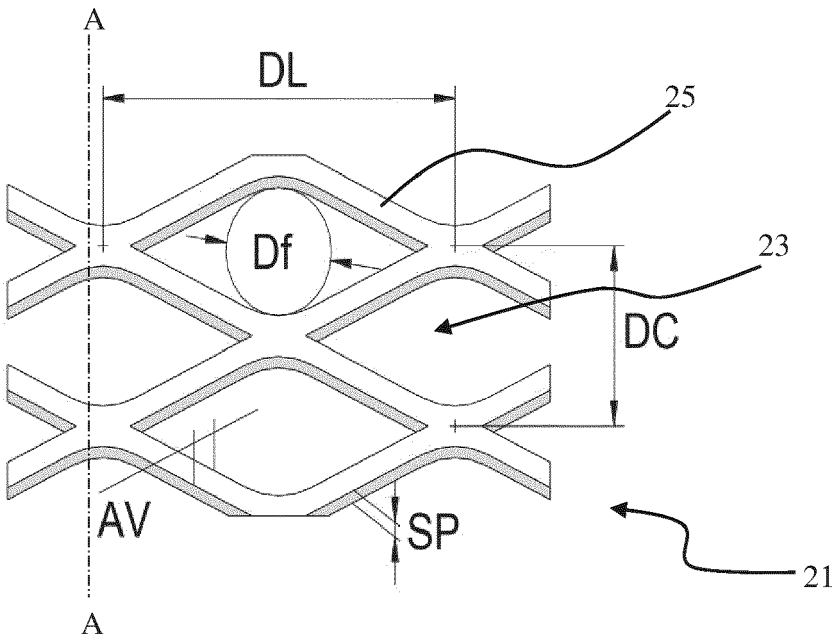

Fig. 2

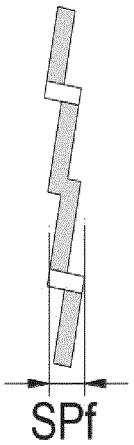

Fig. 3

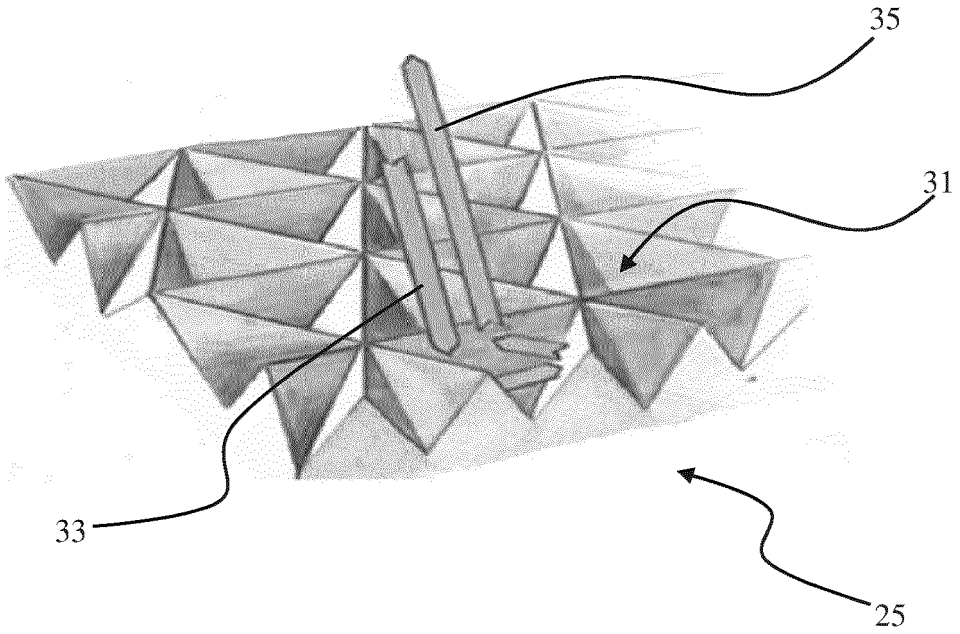

Fig. 4

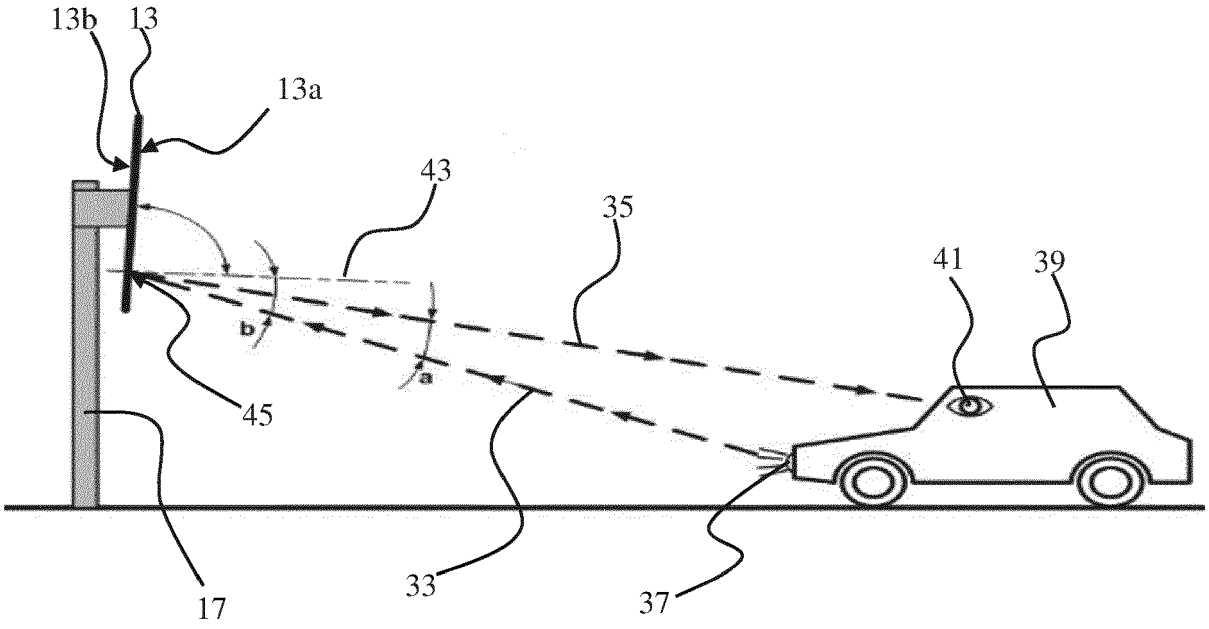

Fig. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 19 4701

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 Y	CN 110 010 033 A (UNIV NORTH CHINA TECHNOLOGY) 12 July 2019 (2019-07-12) * abstract; figures 1,2 * * claims 1-7 * -----	1-5,8-10 6,7	INV. G09F7/00 G09F7/16 G09F15/00 G09F19/22
X A	KR 101 484 676 B1 (CREATIVE AND CO LTD [KR]) 28 January 2015 (2015-01-28) * abstract; figures 1-6 * -----	1,2,5,8 3,4,6,7, 9,10	ADD. G09F7/18
Y A	WO 98/18028 A1 (NIPPON CARBIDE KOGYO KK [JP]; MIMURA IKUO [JP]; ADACHI KEIJI [JP]) 30 April 1998 (1998-04-30) * paragraphs [0005], [0048] * * figures 1-8 * -----	6,7 1-5,8-10	

TECHNICAL FIELDS SEARCHED (IPC)

G09F
E01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 January 2021	Zanna, Argini

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 19 4701

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-01-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 110010033 A	12-07-2019	NONE	
KR 101484676 B1	28-01-2015	KR 101484676 B1	28-01-2015
		WO 2015072772 A1	21-05-2015
WO 9818028 A1	30-04-1998	CA 2240789 A1	30-04-1998
		CN 1210594 A	10-03-1999
		DE 69732025 T2	03-11-2005
		EP 0887665 A1	30-12-1998
		US 6083607 A	04-07-2000
		WO 9818028 A1	30-04-1998

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 03200093 U **[0008]**
- CN 208250956 U **[0008]**
- KR 101886617 B1 **[0008]**