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(54) **Elevated pedestrian walkway with signaling lights**

(57) According to the invention, a pedestrian walkway (1) is provided, incorporating signaling lights (SL) consisting of LEDs (6) with a very low voltage power supply source (7) and a timer (8). The walkway includes: access areas (A-A) that incorporate pressure sensors (DP) activated by the weight of the pedestrians, and that turn on the power supply of the LEDs; a crossing section (P) including header sections (TC) and an intermediate section (TI). The access areas consist of parts (2) that are flexed by the weight of a pedestrian, the header sections consisting of header parts (3) levelled with the ac-

cess part and which are adapted to allow the flexion of the access part; the intermediate section consist of intermediate parts (4) levelled with the header parts; a frame (5) is used to anchor the header and intermediate parts to the road; the LEDs are housed inside the side edge (30, 40) of the access and intermediate parts, and the sensors (DP) consist of an driver item (9), a magnet, mounted on the access parts, and a receiver (10), as well as a magnetic switch mounted on the header part, which is switch on by means of one of the access parts (2) which displaces the magnet to face the magnetic switch.

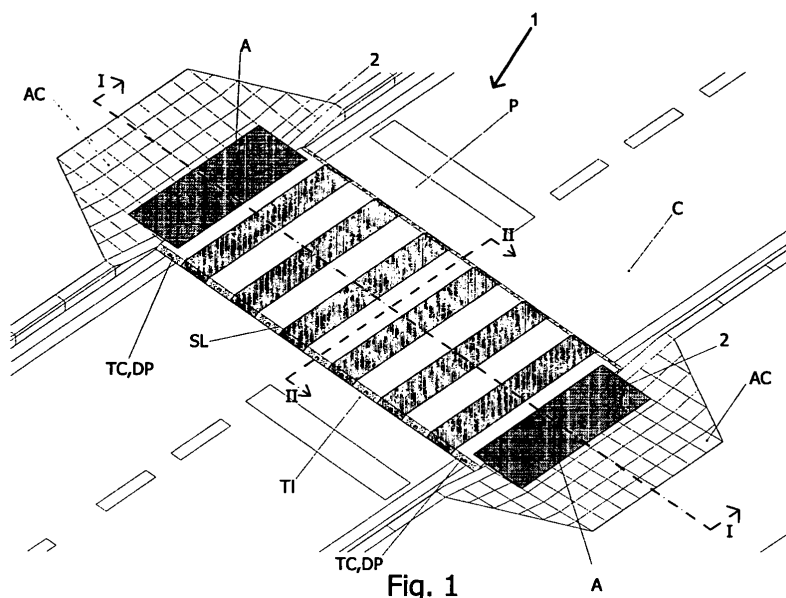


Fig. 1

Description**DESCRIPTION**

Elevated pedestrian walkway with signaling lights

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Scope of the invention and prior art

[0001] This invention generally refers to an elevated walkway with indicator lights, aimed at the passing of pedestrians.

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[0002] Pedestrian walkways, also known as elevated crosswalks, are commonly used, on the one hand, with the aim of facilitating the access of pedestrians from the sidewalk and, on the other hand, to force vehicles to substantially reduce their speed when they are crossing the walkway.

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[0003] It is also well known the use of all kinds of indicator lights and/or reflective indicators installed on the pavement to indicate obstacles or areas where the vehicles must reduce their speed or even stop.

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[0004] Document ES 1067629 describes a pedestrian crosswalk with an indicator light and a LED-based illuminated horizontal band installed on the pavement, such crosswalk being connected to a photovoltaic panel and including a long-range optical detector to detect whether a vehicle is approaching the crosswalk, as well as a short-range optical detector to detect the presence of a pedestrian who is passing through the crosswalk.

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[0005] Document ES 2311398 discloses a pedestrian crosswalk with indicator lights installed on the pavement and vertical illuminated signs that are switched on when a pedestrian starts crossing the road, such pedestrian being detected with the help of photo cells installed at the crosswalk.

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[0006] Document ES 2310120 reveals a pedestrian crosswalk with piezoelectric pressure sensors located at the accesses to the crosswalk and LED-based indicators that are switched on when pedestrians access or circulate through the crosswalk, the assembly including a central part that elevates to prevent the traffic of vehicles.

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Summary of the invention

[0007] On the basis of the state of the art previously described, the invention provides a pedestrian crosswalk that can be installed as an elevated walkway, including signaling lights that can be automatically switched on when the pedestrian is standing on the walkway to cross it, such walkway being foreseen as a series of modular items that are very easy to install and assemble.

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[0008] According to the invention, this goal is achieved through the characteristics described in claim 1. Other additional characteristics of the invention are described in the dependent claims.

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[0009] The invention provides an elevated walkway with signaling lights consisting of electroluminescent diodes or LEDs fed at a very low voltage from the mains

network or through a photovoltaic panel, such walkway being arranged with a longitudinal section and a cross section, essentially in a trapezium shaped, such walkway includes:

- access areas located at both sides of the pavement or the road, with pressure sensors that serve to switch on the power supply to the indicator lights when there is at least a pedestrian standing at, or circulating through such access area;
- a crossing area with the signaling lights installed, including respective header sections adjacent to said access areas, as well as an intermediate section that define the platform aimed at pedestrian circulation; and such walkway according to the invention being **characterised in that:**
 - the access areas consist of respective access parts in the shape of a plate, with a first end located at the level of the sidewalk and a second opposite end directed towards the walkway itself, such access parts can be resilient biased through the flexion caused by the weight of at least a pedestrian standing at or circulating through them;
 - the header sections of the crossing area consist of respective header parts adapted to be coupled at the level of the second end of the corresponding access part, and are also adapted to allow the flexion of such access part;
 - the intermediate section of the crossing area is formed by a plurality of intermediate parts (4), in an appropriate amount to cover the length of the pedestrian walkway; the arrangement of each one of such parts is adapted to be laid at the same level as the said header parts, forming with them the platform aimed at pedestrians circulation;
 - a tubular frame bar-shaped is provided to be anchored to the floor of the pavement or road to be signalled, in the said frame the header parts and the intermediate parts are fixed as whole;
 - the LEDs that constitute the signaling lights are embedded at predetermined regular distances within the respective side edges of the access parts and the intermediate parts, the power supply of such signaling lights consisting of a very low voltage DC power supply with a rechargeable battery, a voltage stabiliser and a timer device; and
 - the pressure sensors being formed by the respective driver element, such as a magnet or a magnetised piece securely fixed on each one of the said access parts, and the respective receiver element formed by an encapsulated magnetic switch mounted at the respective header part and arranged to be switched on supplying voltage to the plurality of LEDs when at least a pe-

destrian is standing at or circulating through at least one of the access parts, thereby displacing the magnet or magnetised piece to face the encapsulated magnetic switch.

[0010] According to an additional characteristic of the invention, it is advantageous to arrange the access parts as a metal plate which is sufficiently resistant to withstand the weight of pedestrians, and which is intrinsically resilient to be biased by flexion.

[0011] According to another additional characteristic of the invention, it is advantageous that the access parts are arranged articulated on the respective header part, so that they can be opened for inspection.

[0012] According to another additional characteristic of the invention, it is advantageous the header parts are provided with a slightly inclined side recess so that the respective access part can be assembled in an articulated manner with different angles, and said header parts are provide with housings for the battery and other elements of the power supply, as well as a transversal duct for a electricity line connecting the battery and the remaining elements of the power supply source.

[0013] According to yet another additional characteristic of the invention, it is advantageous that the header parts and the plurality of intermediate parts are provided at their side edges with mortises to house inlayed the respective LEDs and additionally the respective longitudinal ducts for the power supply line of the LEDs.

[0014] According to yet another additional characteristic of the invention, it is advantageous that the angle formed by the side edges of the header parts and the intermediate parts, with respect to the road is at least of 7°.

[0015] Furthermore, according to another additional characteristic of the invention, it is advantageous that the header parts and the intermediate parts are fixed to the road by anchoring means such as plug and screw type, housed at the respective mortises provided in the respective side edges.

[0016] According to yet another additional characteristic of the invention, it is advantageous that the header parts and the intermediate parts are joined by means of butterfly pieces and that they are additionally fixed at their central part to the tubular frame, also by means of plug and screw anchoring means housed at the relevant mortises provided at the central part of the respective header parts and the plurality of intermediate parts.

[0017] According to yet another additional characteristic of the invention, it is advantageous that the header parts incorporate a manhole covering the housings and the transversal duct, to protect in an accessible manner the battery and the remaining element of the power supply source and the electrical line.

[0018] Furthermore, according to yet another additional characteristic of the invention, it is advantageous that the header parts are provided a drain duct to evacuate eventual leaks of liquids that may penetrate inside the

assembly.

[0019] Furthermore, according to yet another additional characteristic of the invention, it is advantageous that the encapsulated magnetic switch which is receiver element of the pressure sensors is located at the respective header part, in an adjustable manner, to adjust its distance with the magnet or magnetised piece which acts as the driver element of the pressure sensors and which is securely mounted on each one of such access parts.

Brief description of the drawings

[0020] Other characteristics and advantages of the invention will become apparent thanks to the following description, explained with the help of the attached drawings, which refer to a non limiting exemplary embodiment of the invention, where:

Figure 1 shows a schematic perspective view of a pedestrian walkway according to the invention;

Figure 2 is an exploded perspective view of a pedestrian walkway according to Figure 1;

Figure 3 shows a partial cross section, viewed through the I-I line of the pedestrian walkway of figure 1, showing a detail of the assembly of its different items;

Figure 4 shows a perspective view of one of the header parts of the pedestrian crosswalk of Figure 1; Figures 5, 6 and 7 show the relevant partial cross sections of the header parts and the intermediate parts of the pedestrian walkway of Figure 1, showing details of the housings of the signaling lights and their fixing to the road through its sides and central section;

Figure 8 shows a block diagram of the power supply installation for the signaling lights of the pedestrian walkway according to Figure 1;

Figure 9 shows a cross-section view through the I-I line of the access area of the crosswalk of Figure 1, showing a detail of the adjustable arrangement of the pressure sensor.

Detailed description of an embodiment of the invention

[0021] According to what has been depicted in the Figures, it can be seen that the pedestrian crosswalk, generally marked with 1 shows a configuration with a longitudinal section, I-I line, in the shape of a trapezium, and a cross section, II-II line, which has also essentially a trapezium shape, such arrangement being easily accessible for pedestrians and compatible with the accesses for handicapped persons that use wheelchairs.

[0022] This walkway 1 includes two access areas A provided at both sides of the pavement or road C, as well as a crossing section P including header sections TC adjacent to the access areas, apart from an intermediate section TI. All of them jointly define the platform aimed at the crossing of pedestrians.

[0023] The access areas A incorporate pressure sensors DP that serve to switch on the power supply of a signaling indicator SL provided at the crossing section P when at least a pedestrian is standing at or circulating through such access areas.

[0024] These access areas consist of access parts 2 in the shape of a plate, for instance a metal sheet, so that they can be resilient biased through the flexion with the weight of at least a pedestrian standing at or crossing them.

[0025] The header sections TC of the crossing area are formed by the respective header parts 3, which are adapted to be coupled at the same level as the relevant access part 2, thereby allowing their flexion.

[0026] The first end 20 of each access part 2 is located at the same level of the sidewalk AC, for instance, an access for the handicapped, while the second end 21 rests against the respective header part 3 on a side recess 31, which has a slight slope to allow the articulated assembly of such access part 2 in different locations, depending on the angle formed by the sidewalk and the road. This way, the access parts 2 can be flexed and the end 21 can be displaced to some extent from its location in front of the relevant header part 3.

[0027] A plurality of intermediate parts 4 are adjacently arranged forming the intermediate section TI of the crossing area P. These intermediate parts 4 are arranged to be laid at the same level as the header parts 3, forming with them the platform of the pedestrian walkway. Such arrangement of parts allows covering the width of the pavement with only an appropriate number of parts, thereby achieving pedestrian crosswalks of different lengths, without limitation.

[0028] A frame bar-shaped 5 is used to secure the header parts 3 and the intermediate parts to the road C, and the whole assembly is firmly anchored as it will be explained hereinafter.

[0029] The header parts 3 and the intermediate parts 4 incorporate inlaid at their respective side edges 30, 40, at least a recessed LED diode 6, and preferably two of them, that form the signaling lights SL that warn about the crossing of pedestrians.

[0030] Additionally, it is advantageous that the side edges 30, 40 of the header parts 3 and the intermediate parts 4 form an angle of at least 7 degrees with the road. This guarantees a proper visibility of the LEDs 6 for an estimated braking distance of 50 meters, for instance, thereby allowing a driver circulating at a speed of approximately 50 km/h enough time to react.

[0031] A very low voltage DC power supply source 7 is used to feed the LED diodes 6, with a rechargeable battery 70, a voltage stabiliser 71 and a timer 8 that allows to regulate the time during which the LEDs 6 are switched on. As indicated in Figure 8, a charger 72 is included, which is fed from the AC mains network; even though it has not been depicted, the battery could be charged by means of a photovoltaic panel incorporated into the pedestrian walkway.

[0032] The relevant access areas A of the pedestrian walkway 1 respectively incorporate pressure sensors DP that are activated when at least a pedestrian is standing at or crosses at least one of the access areas. These pressure sensors consist of the respective driver element 9, which has been formed as a magnet or a magnetised piece securely mounted at the lower part of each one of the access parts 2, and the relevant receiver element 10, formed as an encapsulated magnetic switch mounted on the respective header part 3 and arranged to be switched on, as it will be explained below, supplying a very low voltage to the plurality of LEDs 6.

[0033] When at least a pedestrian is standing at, or circulating at least through one of the access parts 2, such part is flexed, the driver element 9, consisting of the magnet or the magnetised piece, is displaced to face the receiver element 10, consisting of the encapsulated magnetic switch located at the respective access part 3, such displacement switches on the magnetic switch and a very low voltage is supplied to the plurality of LEDs 6.

[0034] As it can be seen in figure 9, the encapsulated magnetic switch that forms the receiver element 10 of the pressure sensors DP is mounted at the respective header part 3, so that the distance between such switch and the magnet or magnetised piece that forms the driver element 9 of the pressure sensors securely fixed to each one of the said access parts 2 can be adjusted. This way it is possible to regulate the pressure sensors to adjust them to a minimum weight that switches on the power supply voltage of the LEDs 6, thereby illuminating the side edges of the pedestrian walkway 1.

[0035] As it can be seen in Figure 3, depicted as a discontinuous line, according to a advantageous embodiment, the plate-shaped access parts 2 are articulated arranged on the respective header part 3, so that they can be opened for maintenance purposes.

[0036] In order to install adequately protected the battery 70 and the remaining elements 71, 8 of the power supply, such items are housed within a series of compartments 32, 33 are arranged at the respective header parts 3. Furthermore, a series of transversal ducts 34 have been provided in these header parts 3, to house an electric line L1 that interconnects the battery and the remaining elements of the power supply source.

[0037] In order to house the LEDs 6 within the side edges 30, 40 of the header parts 3 and the plurality of intermediate parts 4, a series of mortises 35, 41 are provided as well as, additionally, a series of longitudinal ducts 36, 42 to house an electric line (L2) for the power supply of the LEDs 6.

[0038] The header parts 3 and the intermediate sections 4, which are fixed to the frame, are also fixed to the road C by anchoring means 11 such as plug and screw type, which are housed at the respective mortises 37, 43 provided at the relevant side edges 30, 40.

[0039] In order to attach the header parts 3 and the intermediate parts 4, a series of butterfly parts 12 are used. As it has been previously mentioned, the central

section of the parts 3 and 4 is fixed to the tubular frame 5, also by anchoring means such as plug and screw type 13 that are housed within the mortises 38, 43, provided at the central area of the respective items 3 and 4, respectively.

[0040] The header parts 3 may incorporate the respective manhole lid 14 that covers the housings 32, 33, and the transversal duct of the battery 70 and the remaining elements 71, 8 of the power supply source and the electric line L1. This way, it is possible to protect these electric items and to access them for maintenance purposes.

[0041] It is also possible to install at the header parts 3 a drain duct 39 to evacuate eventual filtrations of liquids that might penetrate inside them.

[0042] As it will be easily understood by those persons skilled in the art, the previous paragraphs are a mere illustrative example of a preferred embodiment of the invention. Therefore, it is possible to introduce any kind of technical modifications.

[0043] Once that the object of the invention has been sufficiently described, it has to be highlighted that any embodiments resulting from changes in the shape, size, etc. and those resulting from any application of the invention which has been previously disclosed, should be understood as included within the scope of the invention, and consequently, the invention will be exclusively limited by the scope of the following claims.

Claims

1. Elevated pedestrian walkway with signaling lights (SL) based on electroluminescent diodes or LEDs, that are fed through the mains network or through a photovoltaic panel, such walkway being arranged with a longitudinal section (I-I) and a cross section (II-II), essentially in a trapezium shaped, such walkway (1) includes:

- access areas (A-A) located at both sides of the pavement or the road (C), with pressure sensors (DP) that serve to switch on the power supply to the indicator lights when there is at least a pedestrian standing at, or circulating through such access area;
- a crossing area (P) with the signaling lights installed, including respective header sections (TC) adjacent to said access areas, as well as an intermediate section (TI) that define the platform aimed at pedestrian circulation; such pedestrian walkway (1) being **characterised in that:**
- the access areas consist of respective access parts (2) in the shape of a plate, with a first end (20) located at the level of the sidewalk and a second opposite end (21) directed towards the walkway itself, such access parts can be resilient biased through the flexion caused by the

weight of at least a pedestrian standing at or circulating through them;

- the header sections of the crossing area consists of respective header parts (3) adapted to be coupled at the level of the second end of the corresponding access part, and are also adapted to allow the flexion of such access part;

- the intermediate section of the crossing area is formed by a plurality of intermediate parts (4), in an appropriate amount to cover the length of the pedestrian walkway; the arrangement of each one of such parts is adapted to be laid at the same level as the said header parts, forming with them the platform aimed at pedestrians circulation;

- a tubular frame bar-shaped(5) is provided to be anchored to the floor of the pavement or road to be signalled, in the said frame the header parts and the intermediate parts are fixed as whole;

- the LEDs (6) that constitute the signaling lights (SL) are embedded at predetermined regular distances within the respective side edges (30, 40) of the access parts and the intermediate parts, the power supply of such signaling lights consisting of a very low voltage DC power supply (7) with a rechargeable battery (70), a voltage stabiliser (71) and a timer device (8); and

- the pressure sensors (DP) being formed by the respective driver element (9), such as a magnet or a magnetised piece securely fixed on each one of the said access parts, and the respective receiver element (10) formed by an encapsulated magnetic switch mounted at the respective header part (3) and arranged to be switched on supplying voltage to the plurality of LEDs when at least a pedestrian is standing at or circulating through at least one of the access parts (2), thereby displacing the magnet or magnetised piece to face the encapsulated magnetic switch.

2. Elevated pedestrian walkway with signalling lights according to claim 1, **characterised in that** the access parts (2) are provided as a metal plate which is sufficiently resistant to withstand the weight of pedestrians, and which is intrinsically resilient to be biased by flexion.

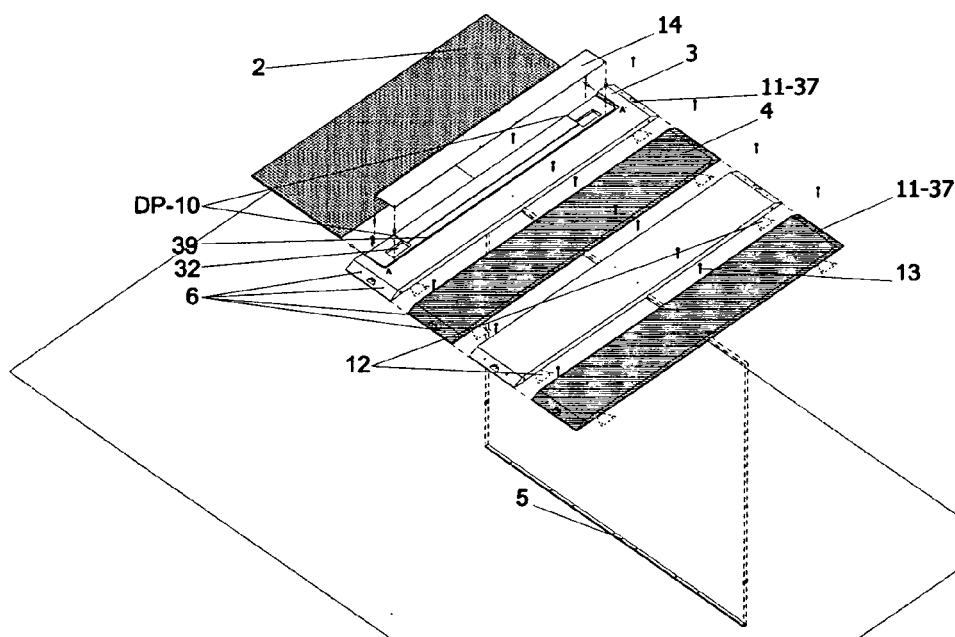
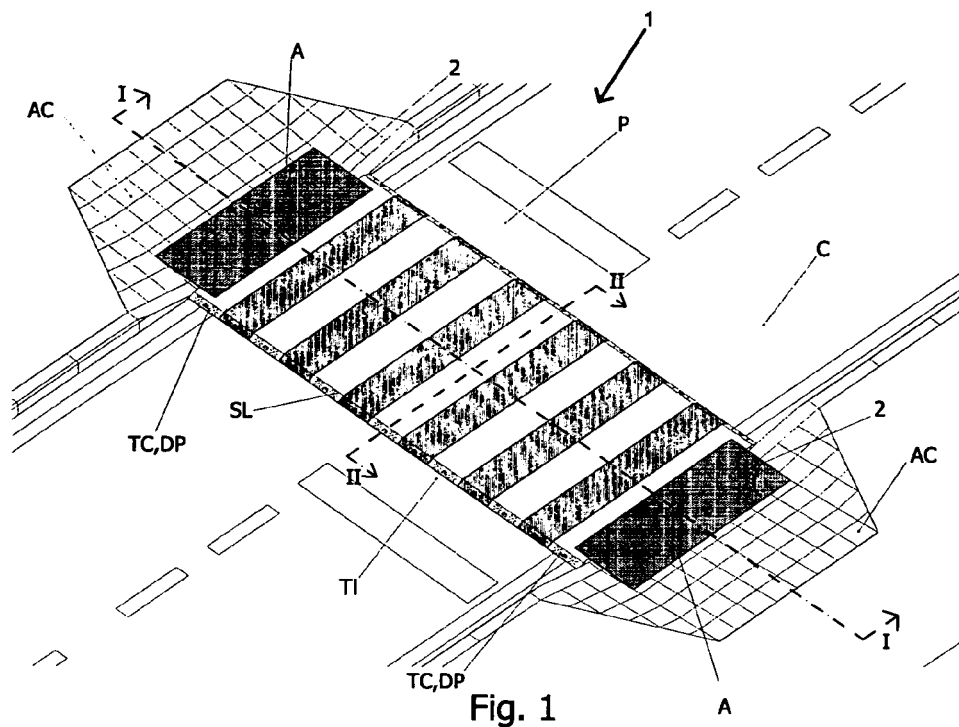
3. Elevated pedestrian walkway with signaling lights according to claims 1 and 2, **characterised in that** the access parts (2) are arranged articulated on the respective header part (3), so that they can be opened for inspection.

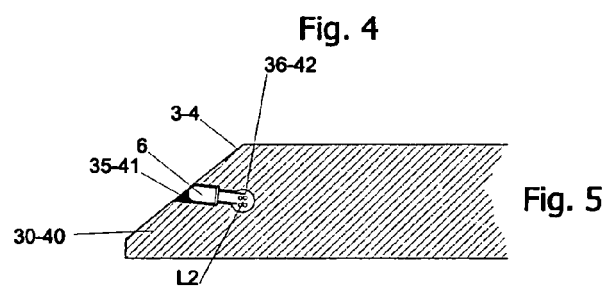
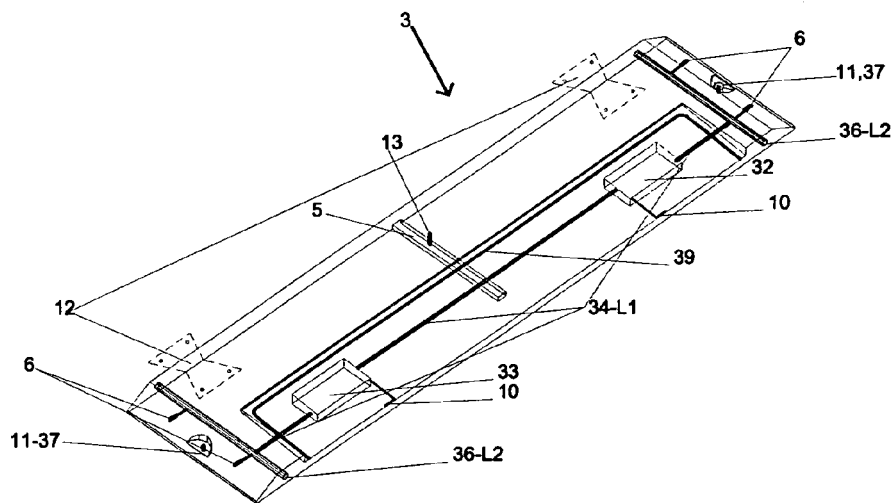
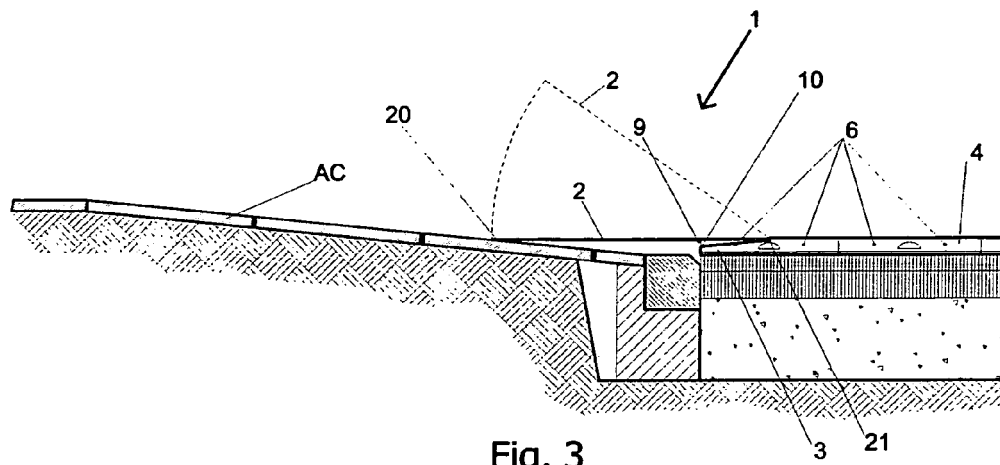
4. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the header parts (3) are provided with a slightly inclined side recess (31) so that the respective ac-

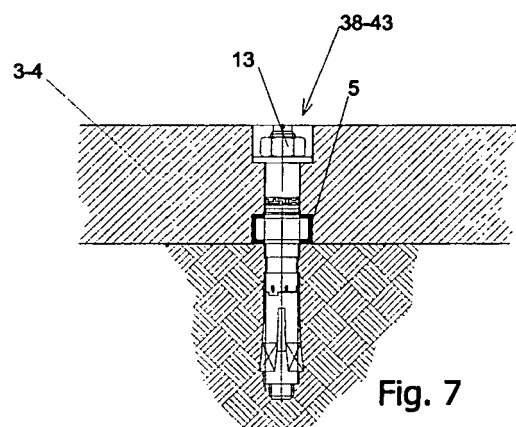
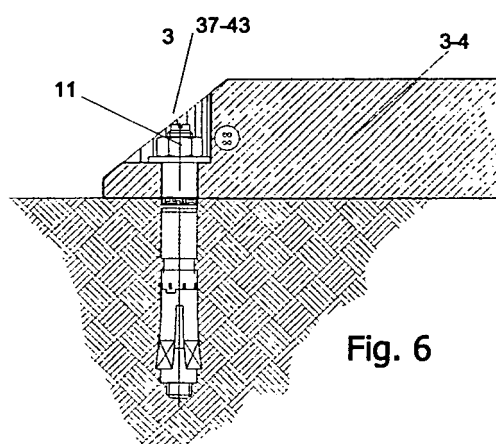
cess part (2) can be assembled in an articulated manner with different angles, and said header parts are provide with housings (32, 33) for the battery (70) and other elements (71, 8) of the power supply, as well as a transversal duct (34) for a electricity line (L1) connecting the battery and the remaining elements of the power supply source.

5. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the header parts (3) and the plurality of intermediate parts (4) are provided at their side edges (30, 40) with mortises (35, 41) to house inlayed the respective LEDs (6) and additionally the respective longitudinal ducts (36, 42) for the power supply line (L2) of the LEDs. 10 15
6. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the angle formed by the side edges (30, 40) of the header parts (3) and the intermediate parts (4), with respect to the road (C), is at least of 7°. 20
7. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the header parts (3) and the intermediate parts (4) are fixed to the road (C) by anchoring means (11) such as plug and screw type, housed at the respective mortises (37, 43) provided in the respective side edges (30, 40). 25 30
8. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the header parts (3) and the intermediate parts (4) are joined by means of butterfly pieces (12) and that they are additionally fixed at their central part to the tubular frame (5), also by means of plug and screw anchoring means (13) housed at the relevant mortises (38, 43) provided at the central part of the respective header parts (3) and the plurality of intermediate parts (4). 35 40
9. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the header parts (3) incorporate a manhole (14) covering the housings (32, 33) and the transversal duct (34), to protect in an accessible manner the battery (70) and the remaining element (71, 8) of the power supply source and the electrical line (L1). 45 50
10. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in that** the header parts (3) is provided a drain duct (39) to evacuate eventual leaks of liquids that may penetrate inside the assembly. 55
11. Elevated pedestrian walkway with signaling lights according to the previous claims, **characterised in**

that the encapsulated magnetic switch which is receiver element(10) of the pressure sensors (DP) is located at the respective header part (3), in an adjustable manner, to adjust its distance with the magnet or magnetised piece which acts as the driver element (9) of the pressure sensors and which is securely mounted on each one of such access parts (2).







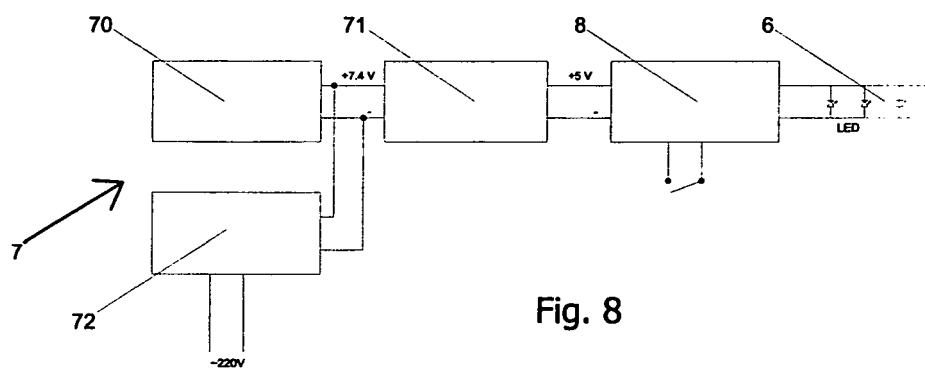


Fig. 8

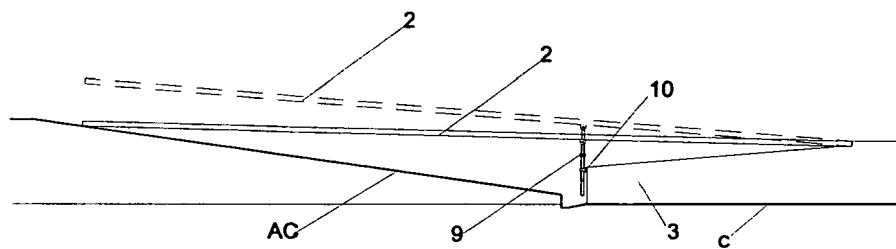


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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