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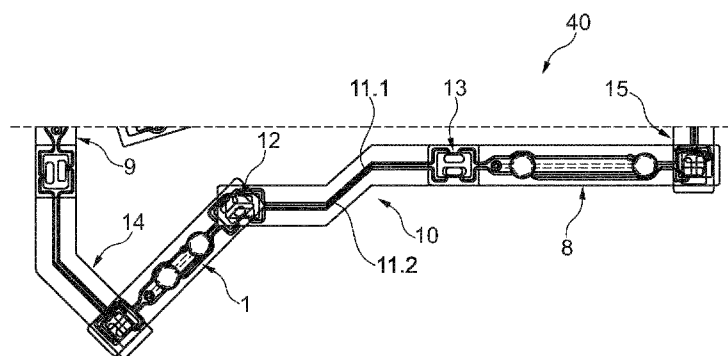


Fig. 2

(57) **Abstract:** The invention relates to a vehicle seat comprising a seat pan (60) and an occupancy sensor arrangement (40, 50). In order to provide an occupancy sensor which can be integrated more easily into various types of vehicle seats, the occupancy sensor arrangement comprises a plurality of separately pre-manufactured sensor modules (1, 8, 9, 16), each sensor module (1, 8, 9, 16) comprising at least one pressure-sensitive element (3.1, 3.2, 18.1, 18.2), and at least one output terminal (4, 19) for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element (3.1, 3.2, 18.1, 18.2). At least one sensor module (1, 8, 9, 16) comprises at least one input terminal (5, 20) for receiving an electrical signal from another sensor module (1, 8, 9, 16) and at least one output terminal (4, 19) configured to relay said electrical signal. The sensor modules (1, 8, 9, 16) are disposed staggeredly along a surface of the seat pan (60) and are electrically connected by connecting an output terminal (4, 19) of one sensor module (1, 8, 9, 16) with an input terminal (5, 20) of another sensor module (1, 8, 9, 16).



Vehicle Seat

Technical Field

[0001] The invention relates to a vehicle seat comprising a seat pan and an occupancy sensor arrangement. It further relates to an occupation sensor arrangement for a vehicle seat, a sensor module and a method for manufacturing an occupation sensor arrangement.

Background Art

[0002] In modern vehicles, seats are often equipped with an occupancy sensor. Such a sensor senses if a person is sitting on the seat and provides a corresponding electrical signal, which is evaluated by some vehicle electronics, like a seat belt reminder or the like. The typical type of occupancy sensor is pressure-sensitive, i.e. it reacts on the pressure (or the force) acting on the seat by a person sitting on it. In a common configuration, such sensor is placed between a seat pan and a B-surface of a seat cushion.

[0003] In order to work reliably, the sensor has to cover at least a considerable part of the seat. There is, however, an increasing variety of complex seat pans, which have a complex surface structure with convex and concave areas and little flat surface where the sensor could be placed. The shape of the seat pan varies depending on the manufacturer and the vehicle model. Moreover, there may even be different seat types available for a single vehicle model, allowing the customer to personalize the interior. Therefore, designing a suitable sensor is a complex and different task for each vehicle. Accordingly, increased development and production costs arise for the various sensors needed.

Technical Problem

[0004] It is thus an object of the present invention to provide an occupancy sensor which can be integrated more easily into various types of vehicle seats. This object is solved by the vehicle seat according to claim 1, an occupancy sensor arrangement according to claim 11, a sensor module according to claim 12 and a method according to claim 13.

General Description of the Invention

[0005] The invention provides a vehicle seat comprising a seat pan and an occupancy sensor arrangement. "Vehicle seat" of course refers to a seat for a vehicle, especially for a car. Seats for boats, trains, planes and other vehicles are also within the scope of the invention, though. The occupancy sensor arrangement is configured to sense whether the seat is occupied or not. It may additionally provide e.g. data regarding the weight of the person sitting on the seat, the distribution of the person's weight on the seat and the like.

[0006] The inventive occupancy sensor arrangement comprises a plurality of separately pre-manufactured sensor modules, wherein each sensor module comprises at least one pressure-sensitive element and at least one output terminal for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element. "Pre-manufactured" means that each of the sensor modules is manufactured in advance before it is integrated into the sensor arrangement. "Separately" means that each sensor module is manufactured as a separate, discrete part (or component) before it is connected to other components as described hereinafter. That is, the sensor arrangement has a modular configuration. Preferably, each sensor module comprises a carrier foil arrangement onto which or between which the pressure sensitive element and the output terminal are arranged.

[0007] The pressure-sensitive element can be of any type known in the art. It may, for instance, be a switching element which is closed when a certain threshold pressure is exceeded. It may also be a foil-type pressure sensor known e.g. as Force Sensing Resistor (FSR), which has a varying resistivity depending on the pressure applied.

[0008] The switching element comprises e.g. a top carrier layer or foil and a bottom carrier layer or foil arranged at a certain distance from one another by means of a spacer. The spacer comprises at least one opening defining an active zone of said switching element in which said top and bottom carrier layers may be brought together in response to a force acting on at least one of said top and bottom carrier layers. The switching element further comprises an electrode arrangement comprising at least a first electrode and a second electrode arranged within said active area of said switching element between said top and bottom

carrier layers in such a way that an electrical contact is established between said first and second electrode if said top and bottom carrier layers are brought together in response to a force acting on at least one of said top and bottom carrier layers.

[0009] The electrical signal can be a current or a voltage which changes depending on the pressure applied. The electrical signal could also be a digital, and possibly complex, signal. In a possible embodiment the electrical signal only indicates whether a threshold pressure has been exceeded. For example, a switch may be closed and thus a current flows, which in this case is the electrical signal. Of course, like in an FSR, the electrical signal could also provide additional information on the amount of pressure or the like. Typically, the pressure sensitive element is a passive element, i.e. it requires connection to a power source to provide the electrical signal. The output terminal can have different numbers of pins (or electrodes). In a typical configuration, it has two pins, which are connected to the electrodes of a switch, which is closed when pressure is applied.

[0010] Moreover, at least one sensor module comprises at least one input terminal for receiving an electrical signal from another sensor module. Of course, as will be explained later, several or even all sensor modules may comprise such an input terminal. The sensor module which comprises such an input terminal also comprises at least one output terminal configured to relay said electrical signal which is received from another sensor module. It is explicitly preferred that one and the same output terminal is configured to output the electrical signal indicative of the applied pressure and to relay the signal from the other sensor module. The term "relay" is to be understood here in a wider sense, which also includes that the signal may be modified and/or combined with the signal of the sensor module itself. For example, if each sensor module generates a current as the electrical signal, the currents of two sensor modules may be added up, corresponding to a parallel connection. In other words, one sensor module relays the current from the other sensor module but adds its own current, so that in effect the sum of both currents is output at the output terminal. If each sensor module comprises a carrier foil arrangement onto which or between which the pressure sensitive element and the output terminal are arranged, it is preferred that the input terminal is arranged onto or between the same carrier foil arrangement.

[0011] It is within the scope of the invention that the input terminal can also be used as an output terminal and vice versa. In such a case, it is physically not distinguishable which one is the input terminal and which one is the output terminal. However, even if so, these are two different terminals, one of which can be used for input and the other for output. Whether or not the terminal can adopt both functions depends, among others, on the working principle of the pressure-sensitive element and the nature of the electrical signal.

[0012] According to the invention, the sensor modules are disposed staggeredly along a surface of the seat pan and are electrically connected by connecting an output terminal of one sensor module with an input terminal of another sensor module. "Staggered along a surface" means that the sensor modules are disposed offset with respect to each other along the surface. Two sensor modules may partially overlap, they may be disposed right next to each other or they may be disposed spaced apart. In any case, the sensor modules cover a larger area of the seat pan than a single sensor module would. Normally, the sensor modules are disposed directly on the surface of the seat pan, i.e. between the seat pan and the B-surface of the seat cushion. They may be attached to the surface of the seat pan by glueing, welding or other connection methods known in the art. However, there might also be some intermediate layer by which the sensor modules are separated from the surface. In such a case they are also considered to be disposed along the surface.

[0013] In any case, the sensor modules are electrically connected. It is conceivable that the connection is branching, so that the output terminals of several sensor modules are connected to the input terminal(s) of a single sensor module (or the output terminal of a single sensor module is connected to the input terminals of several other modules). According to a preferred embodiment, the modules are connected in a chain-like, linear arrangement, where each sensor module is connected to exactly two other sensor modules, i.e. to one via its input terminal and to one via its output terminal. Of course, in this chain of modules, the first and last module are only connected to one other module.

[0014] According to the invention, instead of using a single, tailored sensor for the respective seat pan, a plurality of modular elements (i.e. the sensor modules) are employed which are staggered (or offset) to cover a larger area. These sensor

modules are smaller than a single sensor would have to be and it is easier to find an appropriate surface to place them on. Nevertheless, since the sensor modules are electrically connected, they cooperate like parts of a single, large sensor.

[0015] Preferably, the sensor module is generally flat so that it does not protrude too much from the surface of the seat pan. It is known in the art that occupation sensors can be produced which only have a thickness of a few millimetres or the like. Especially, but not exclusively, when the sensor module is flat in shape, it is preferred that the output terminal and the input terminal are disposed in a peripheral region of the sensor module, i.e. near its edge.

[0016] It is conceivable that an input terminal of one module and an output terminal of another module are connected directly. However, in order to allow for increased flexibility without having to use too many different types of sensor modules, it is preferred that at least two sensor modules are connected by a separately pre-manufactured connector module. Such a connector module, of course, needs to comprise terminals which are compatible with the input and output terminal, respectively. Further, it has to comprise wires or conducting paths to connect the respective pins of the input and output terminal. The connector module basically functions as a connector cable. It can have different geometries, but typically is designed flat so that it doesn't stand out too far from the surface of the seat pan. It should be noted that a connector module, though having some flexibility, may have an inherent shape that is adapted to connect sensor modules having a certain position relative to each other.

[0017] In a preferred embodiment, the connector module at least partially overlaps each of the two sensor modules. Such a configuration is in particular possible when all modules are designed with a flat shape, so that overlap does not increase the overall thickness of the arrangement too much. It is possible that during assembly, first the sensor modules are attached to the seat pan and afterwards the connector module is connected so that it is placed above the sensor modules (with respect to the surface of the seat pan). This configuration may facilitate the assembly process and it is also conceivable that the electrical connections between the modules are protected by the overlap.

[0018] It is preferred that at least some of the sensor modules are elongately shaped. This is due to the fact that on the complex-shaped surface, it is easier to

find a relatively flat area which is elongate (or, in other words, narrow) than one which extends equally wide in any direction. If, however, a wider area is available, two or more elongate sensor modules may be placed side-by-side to cover this area.

[0019] According to one embodiment, the input terminal and the output terminal are disposed on different sides of the sensor module. This is particularly useful when the sensor modules are connected with each other sequentially in a chain-like manner. For example, when the sensor module is flat in shape, the input and output terminal can be disposed in a peripheral region but angularly spaced apart. In particular, in an elongate sensor module, the terminals can be disposed on opposing ends.

[0020] The particular advantage of the inventive concept is that surfaces of almost any shape can be covered using standardised, pre-manufactured sensor modules. Therefore, it is possible that at least two sensor modules are identical. It is understood that "identical" does not mean that these are the same elements, but that they are exactly alike, undistinguishable. In fact, all sensor modules may be identical. In any case, it is possible to construct a vast variety of sensor assemblies using only a very limited number of types of sensor modules.

[0021] It is also possible to use standardised connector modules. Therefore, at least two connector modules may be identical. Here, it is also conceivable to construct virtually any type of sensor assembly using only a limited number of different connector modules.

[0022] As mentioned above, the input and output terminals can be relatively simple. According to one embodiment, each output terminal comprises a first pair of electrodes, between which the at least one pressure-sensitive element is electrically connected, and each input terminal comprises a second pair of electrodes, which are electrically connected to the first pair of electrodes of the same sensor module. The at least one pressure-sensitive element is connected between the first pair of electrodes, so that a voltage applied to the first pair of electrodes is also applied to the pressure-sensitive element. In this context, it is highly preferred that a resistivity of the pressure-sensitive element is pressure-dependent. For instance, the pressure-sensitive element may be a switching element or an FSR. Of course, the first and second pair of electrodes are

electrically connected so that one electrode of the first pair is connected to one electrode of the second pair and the other electrode of the first pair is connected to the other electrode of the second pair. Since the second pair of electrodes is connected to the first pair of electrodes, the at least one pressure-sensitive element is also electrically connected between the second pair of electrodes. Needless to say, in this embodiment the electrical signal is an analog signal, normally the current that flows when a particular voltage is applied between the electrodes of the output terminal. At the same time, the voltage between the second pair of electrodes will be the same as the voltage applied between the first pair of electrodes. This voltage in turn may be applied to the output terminal of another sensor module. An embodiment like this eliminates the need for digital-to-analog conversion or analog-to-digital conversion on the level of the sensor modules.

[0023] The electrical signals generated by the sensor modules need to be processed by the vehicle computer or the like. For this purpose, the sensor arrangement preferably comprises a readout module which has a readout interface for connection to a processing device of the vehicle, and which is connected to the output terminal of at least one sensor module. The readout interface is an interface compatible with a connection to the processing device (e.g. the on-board computer of a car). The readout module may possibly also be a (special) sensor module. It is, however, preferred that this is a dedicated type of element without sensor functionality. It is understood that the readout module also may comprise an input terminal similar to the input terminals of the sensor modules and that it may be connected to the output terminal of a sensor module by means of a connector module. Alternatively, it may be connected directly to the output terminal.

[0024] It is conceivable that the modules (sensor modules, connector modules and readout module, if present) are detachably connected. It is preferred, though, that at least two modules are non-detachably connected. This may be achieved by various methods like crimping, electrical welding or thermal bonding. It is particularly preferred that the different elements are connected by ultrasonic welding. Of course, it is possible that more than two, in particular all modules are

(pairwise) none-detachably connected and/or that different connection methods are used for different pairs of elements.

[0025] The invention further provides an occupancy sensor arrangement for a vehicle seat having a seat pan. The arrangement comprises a plurality of separately pre-manufactured sensor modules, each sensor module comprising at least one pressure-sensitive element and at least one output terminal for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element. At least one sensor module comprises at least one input terminal for receiving an electrical signal from another sensor module and at least one output terminal configured to relay said electrical signal. The sensor modules are electrically connected by connecting an output terminal of one sensor module with an input terminal of another sensor module and the sensor modules are arranged to be disposed staggeredly along the surface of the seat pan. All these terms have been explained with reference to the inventive vehicle seat above and will not be explained again.

[0026] Preferred embodiments of the inventive occupancy sensor arrangement correspond to the inventive vehicle seat described above.

[0027] The invention also provides a sensor module as a separately pre-manufactured part for an occupancy sensor arrangement for a vehicle seat having a seat pan. The sensor module comprises at least one pressure-sensitive element, at least one output terminal for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element, at least one input terminal for receiving an electrical signal from another separately pre-manufactured sensor module and at least one output terminal configured to relay said electrical signal.

[0028] Preferred embodiments of the inventive sensor module have been explained above with reference to the inventive vehicle seat.

[0029] Finally, the invention provides a method for manufacturing an occupancy sensor arrangement for a vehicle seat having a seat pan. According to the method, a plurality of separately pre-manufactured sensor modules is provided, each sensor module comprising at least one pressure-sensitive element and at least one output terminal for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element. At least one sensor module comprises

at least one input terminal for receiving an electrical signal from another sensor module and at least one output terminal configured to relay said electrical signal. The sensor modules are disposed staggeredly along the surface of the seat pan and they are electrically connected by connecting an output terminal of one sensor module with an input terminal of another sensor module. Herein, the sensor modules may be disposed along the surface before they are electrically connected or afterwards. The electrical connection may also be established at the same time the respective sensor module is disposed along the surface.

[0030] Again, all these terms have been described above with respect to the inventive vehicle seat. Preferred embodiments of the inventive method correspond to those of the vehicle seat.

Brief Description of the Drawings

[0031] Preferred embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a schematic view of an inventive sensor module according to a first embodiment;

Fig. 2 is a schematic view of a part of an inventive occupancy sensor arrangement according to a first embodiment;

Fig. 3 is a schematic view of an inventive sensor module according to another embodiment and an inventive connector module; and

Fig. 4 is a schematic view of a seat pan with an inventive occupancy sensor arrangement according to a second embodiment.

Description of Preferred Embodiments

[0032] Fig.1 shows a first embodiment of an inventive sensor module 1. The sensor module 1 comprises preferably a foil type pressure sensor with a carrier foil arrangement 2, on which or between which several components are applied. The overall shape of the sensor module 1 is elongate and straight. On the opposing ends of the carrier foil arrangement 2, an output terminal 4 and input terminal 5 are provided. In the central part of the sensor module 1, two pressure-sensitive cells 3.1, 3.2 are disposed. In a preferred embodiment, these are force sensing resistors, whose resistivity decreases when a pressure is applied. The cells 3.1,

3.2 are connected to two electrodes 4.1, 4.2 of the output terminal 4 via conductor paths 6.1, 6.2. When a voltage is applied between the electrodes 4.1, 4.2, the current flowing through the cells 3.1, 3.2 is indicative of the pressure acting on them.

[0033] The pressure-sensitive cells 3.1, 3.2 - and thus the output terminal 4 - are also connected via conductor paths 6.3, 6.4 to two electrodes 5.1, 5.2 of the input terminal 5. As long as no other element is connected to the input terminal 5, the two electrodes 5.1, 5.2 are isolated and basically have no influence on the total current flowing between the electrodes 4.1, 4.2 of the output terminal 4.

[0034] The situation is different when the sensor module 1 is part of an inventive occupancy sensor arrangement 40, as shown in fig. 2. Here, three different sensor modules 1, 8, 9 together with three connector modules 10, 14, 15 are connected in a linear, the chain-like arrangement. The input terminal 5 of the sensor module 1 is connected to the first terminal 12 of a first connector module 10, which is also elongate but shaped similar to an S-curve. The connector module 10 is basically a printed carrier foil arrangement with two conductor paths 11.1, 11.2 e.g. arranged between two laminated carrier foils, which connect the first terminal 12 with the second terminal 13. The second terminal 13 is connected to an output terminal of another sensor module 8, which is basically constructed like sensor module 1, but slightly longer. This sensor module 8, in turn is connected to another sensor module (not shown) via another connector module 15. On the other side, the sensor module 1 is connected to another sensor module 9 via another connector module 14, which is has an elongate, angled shape. In the embodiment shown, the different modules 1, 8, 9, 10, 14, 15 are connected by ultrasonic welding. However, other methods like crimping, welding etc. could be used.

[0035] It is clear that a relatively complex area can be covered by the sensor arrangement 40, although it is constructed of a limited number of simply-shaped modules.

[0036] Fig. 3 shows a schematic representation of another sensor module 16 and another connector module 21. The sensor module 16 also is elongately shaped but slightly angled or bent. It also comprises a carrier foil arrangement 17 with two pressure-sensitive cells 18.1, 18.2 and has an input terminal 20 and an output terminal 19. The connector module 21, like the ones shown in Fig.2, has two

terminals 22, 23 which are compatible to the input and output terminals 19, 20. However, this connector module 21 is arc-shaped.

[0037] In Fig. 4, the abovementioned modules 16, 21 are part of another embodiment of an occupancy sensor arrangement 50, which is disposed on the surface of a seat pan 60. The seat pan 60 has a complex shape with convex and concave areas and also comprises a series of holes 61. Therefore, it is difficult to place an occupancy sensor on the surface. This is achieved by placing two identical sensor modules 16 a little spaced-apart from each other, wherein the elongate and bent shape of the modules 16 - which are identical to the one shown in Fig. 3 - makes it possible to place them so that they bypass the holes 61. They are electrically connected via the connector module 21 of Fig. 3. The arc-like shape of the connector module 21 allows it to circumvent one of the holes 61, so that this hole 61 is not obstructed and the connector module 21 is placed with its entire area on the surface of the seat pan 60. One sensor module 16 is connected with its output terminal to a readout module 24, which is connectable to a vehicle onboard computer. In this embodiment, the readout module basically consists of two wires with a readout terminal on one side and a terminal compatible to the output terminal of the sensor module 16 on the other side. However, the readout module could be more complex or could also comprise a printed circuit board like the other modules 16, 21.

Legend of Reference Numbers:

1, 8, 9, 16	sensor module
2, 17	printed circuit board
3.1, 3.2, 18.1, 18.2	pressure-sensitive cell
4, 19	output terminal
4.1, 4.2, 5.1, 5.2	electrode
5, 20	input terminal
6.1, 6.2, 6.3, 6.4, 11.1, 11.2	conductor path
10, 14, 15, 21	connector module
12, 13, 22, 23	terminal
24	readout module
40, 50	sensor arrangement
60	seat pan
61	hole

Claims

1. Vehicle seat comprising a seat pan (60) and an occupancy sensor arrangement (40, 50), which comprises a plurality of separately pre-manufactured sensor modules (1, 8, 9, 16), each sensor module (1, 8, 9, 16) comprising
 - at least one pressure-sensitive element (3.1, 3.2, 18.1, 18.2), and
 - at least one output terminal (4, 19) for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element (3.1, 3.2, 18.1, 18.2),wherein at least one sensor module (1, 8, 9, 16) comprises at least one input terminal (5, 20) for receiving an electrical signal from another sensor module (1, 8, 9, 16) and at least one output terminal (4, 19) configured to relay said electrical signal, and
wherein the sensor modules (1, 8, 9, 16) are disposed staggeredly along a surface of the seat pan (60) and are electrically connected by connecting an output terminal (4, 19) of one sensor module (1, 8, 9, 16) with an input terminal (5, 20) of another sensor module (1, 8, 9, 16).
2. Vehicle seat according to claim 1, characterised in that at least two sensor modules (1, 8, 9, 16) are connected by a separately pre-manufactured connector module (10, 14, 15, 21).
3. Vehicle seat according to claim 2, characterised in that the connector module (10, 14, 15, 21) partially overlaps each of the two sensor modules (1, 8, 9, 16).
4. Vehicle seat according to any one of claims 1 to 3, characterised in that at least some of the sensor modules (1, 8, 9, 16) are elongately shaped.
5. Vehicle seat according to any one of claims 1 to 4, characterised in that the input terminal (5, 20) and the output terminal (4, 19) are disposed on different sides of the sensor module (1, 8, 9, 16).
6. Vehicle seat according to any one of claims 1 to 5, characterised in that at least two sensor modules (1, 8, 9, 16) are identical.

7. Vehicle seat according to any one of claims 1 to 6, characterised in that at least two connector modules (10, 14, 15, 21) are identical.
8. Vehicle seat according to any one of claims 1 to 7, characterised in that each output terminal (4, 19) comprises a first pair of electrodes (4.1, 4.2), between which the at least one pressure-sensitive element (3.1, 3.2, 18.1, 18.2) is electrically connected, and each input terminal (5, 20) comprises a second pair of electrodes (5.1, 5.2), which are electrically connected to the first pair of electrodes (4.1, 4.2) of the same sensor module (1, 8, 9, 16).
9. Vehicle seat according to any one of claims 1 to 8, characterised by a readout module (24) which has a readout interface for connection to a processing device of the vehicle, and which is connected to the output terminal (5, 20) of at least one sensor module (1, 8, 9, 16).
10. Vehicle seat according to any one of claims 1 to 9, characterised in that at least two modules (1, 8, 9, 16) are non-detachably connected by crimping, ultrasonic welding, electrical welding or thermal bonding.
11. Occupation sensor arrangement for a vehicle seat having a seat pan (60), comprising a plurality of separately pre-manufactured sensor modules (1, 8, 9, 16), each sensor module (1, 8, 9, 16) comprising
 - at least one pressure-sensitive element (3.1, 3.2, 18.1, 18.2), and
 - at least one output terminal (5, 20) for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element (3.1, 3.2, 18.1, 18.2),wherein at least one sensor module (1, 8, 9, 16) comprises at least one input terminal (5, 20) for receiving an electrical signal from another sensor module (1, 8, 9, 16) and at least one output terminal (4, 19) configured to relay said electrical signal;
the sensor modules (1, 8, 9, 16) are electrically connected by connecting an output terminal (4, 19) of one sensor module (1, 8, 9, 16) with an input terminal (5, 20) of another sensor module (1, 8, 9, 16); and
the sensor modules (1, 8, 9, 16) are arranged to be disposed staggeredly along a surface of the seat pan (60).

12. Sensor module (1, 8, 9, 16) as a separately pre-manufactured part for an occupation sensor arrangement for a vehicle seat having a seat pan (60), comprising
- at least one pressure-sensitive element (3.1, 3.2, 18.1, 18.2),
 - at least one output terminal (4, 19) for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element (3.1, 3.2, 18.1, 18.2),
 - at least one input terminal (5, 20) for receiving an electrical signal from another separately pre-manufactured sensor module (1, 8, 9, 16) and at least one output terminal (4, 19) configured to relay said electrical signal;
13. Method for manufacturing a occupation sensor arrangement for a vehicle seat having a seat pan (60), the method comprising the steps of:
- providing a plurality of separately pre-manufactured sensor modules (1, 8, 9, 16), each sensor module (1, 8, 9, 16) comprising
 - at least one pressure-sensitive element (3.1, 3.2, 18.1, 18.2), and
 - at least one output terminal (5, 20) for outputting an electrical signal indicative of a pressure applied to the pressure-sensitive element (3.1, 3.2, 18.1, 18.2),wherein at least one sensor module (1, 8, 9, 16) comprises at least one input terminal (5, 20) for receiving an electrical signal from another sensor module (1, 8, 9, 16) and at least one output terminal (4, 19) configured to relay said electrical signal;
 - disposing the sensor modules (1, 8, 9, 16) staggeredly along a surface of the seat pan (60); and
 - electrically connecting the sensor modules (1, 8, 9, 16) by connecting an output terminal (4, 19) of one sensor module (1, 8, 9, 16) with an input terminal (5, 20) of another sensor module (1, 8, 9, 16).

1/2

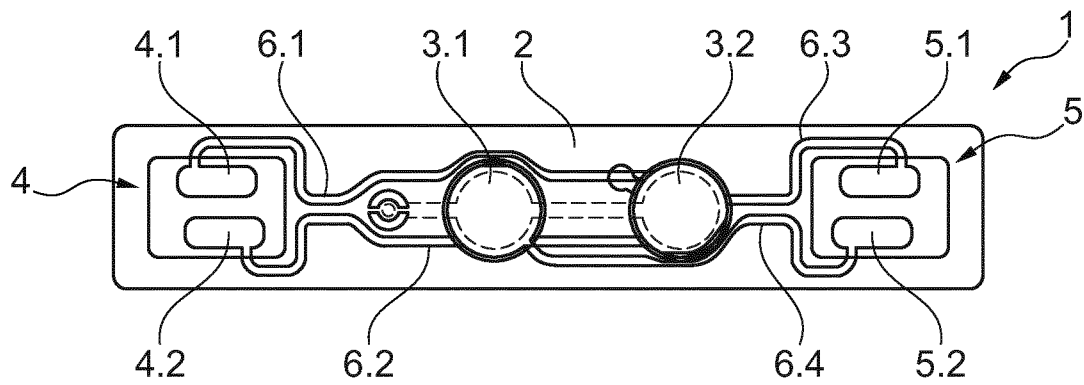


Fig. 1

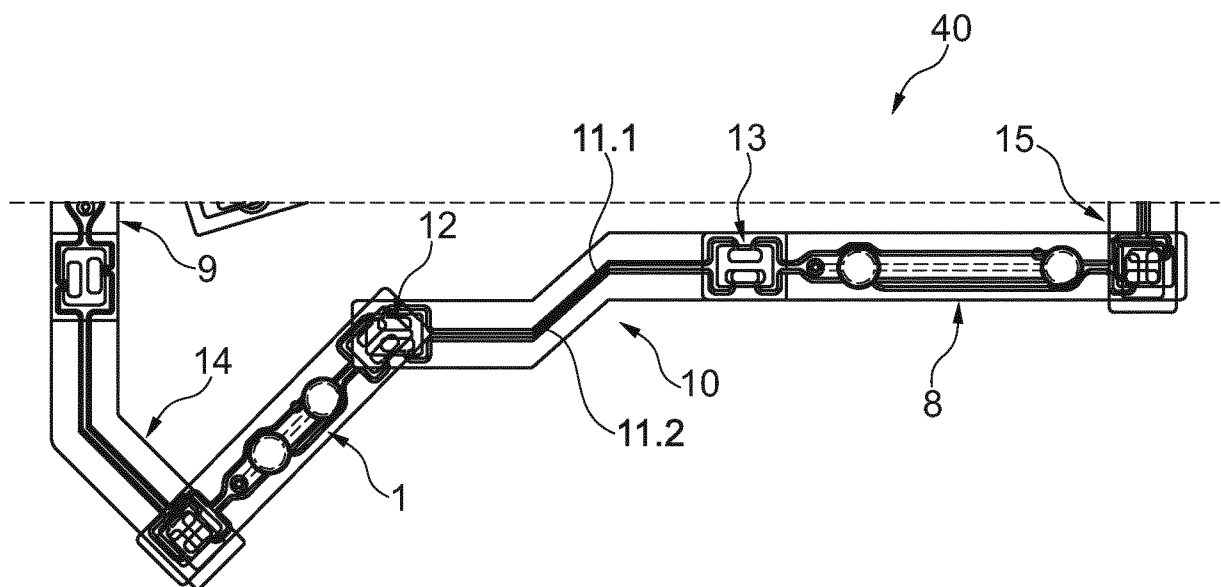


Fig. 2

2/2

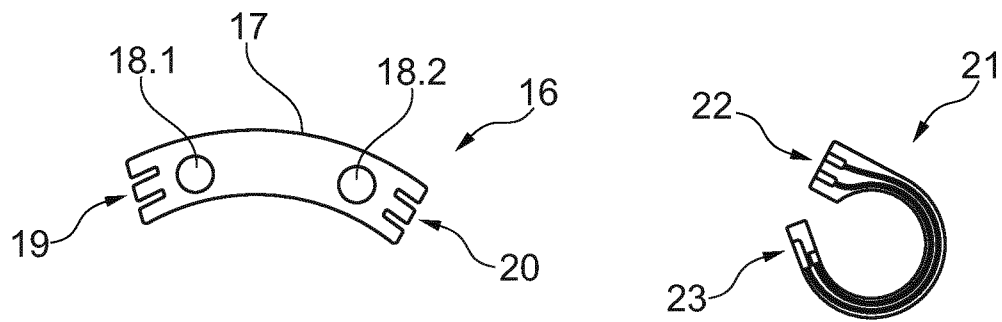


Fig. 3

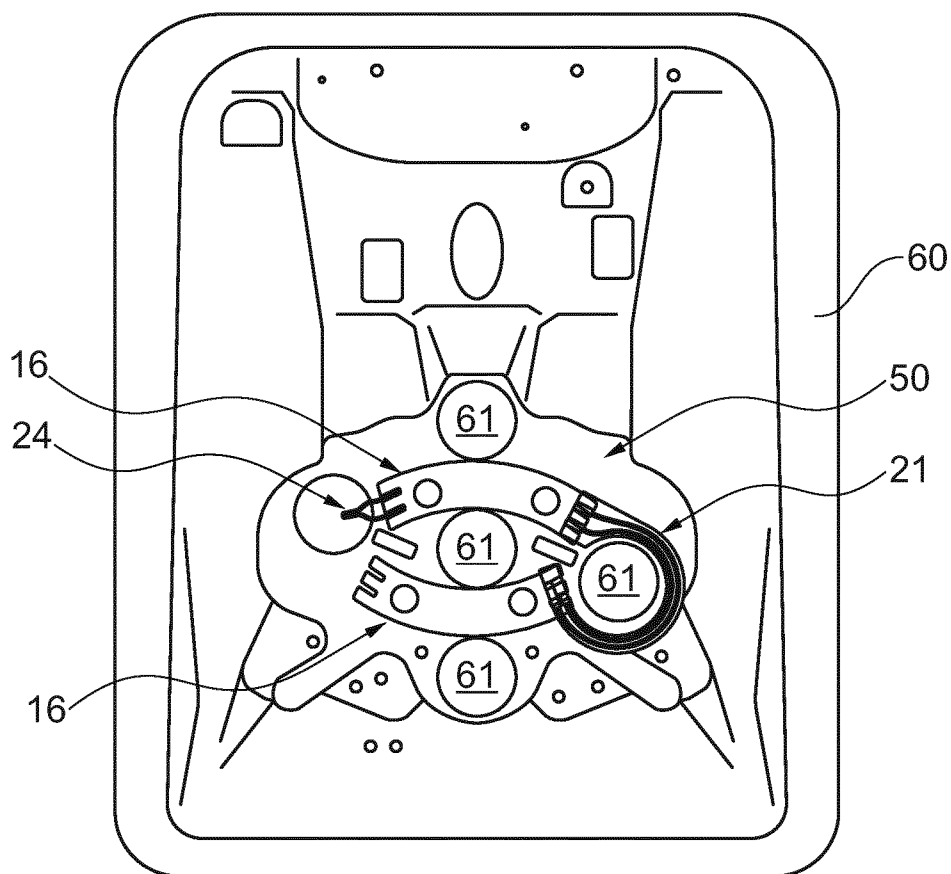


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/077107

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60N2/00 G01G19/414
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B60N G01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/107258 A1 (SAITOH YUKIHIRO [JP] ET AL) 30 April 2009 (2009-04-30) figures 1-4	1-7,9-13
A	-----	8
A	DE 20 2009 012350 U1 (IG BAUERHIN GMBH [DE]) 22 April 2010 (2010-04-22) figure 2	1-13
A	-----	
A	US 2007/194900 A1 (HAWKINS ERIC T [US] ET AL) 23 August 2007 (2007-08-23) paragraph [0071]; figure 9	1-13
A	-----	
A	US 2012/123985 A1 (KWON YOUNG JOON [KR] ET AL) 17 May 2012 (2012-05-17) paragraph [0028]; figure 2	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

24 February 2016

Date of mailing of the international search report

07/03/2016

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/077107

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