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(54) VEHICLE INTERIOR PANEL, CORRESPONDING VEHICLE DOOR, AND VEHICLE HAVING SUCH PANEL

(57) The invention provides a panel for the interior of a vehicle characterized in that the panel contains a sensor for capturing ambient noise (25, 27, 30) and is configured to, via an adjacent surface of the vehicle (20), emit an anti-noise in antiphase to the ambient noise (25, 27, 30).

The invention further provides a corresponding door (10) and a corresponding vehicle (20).

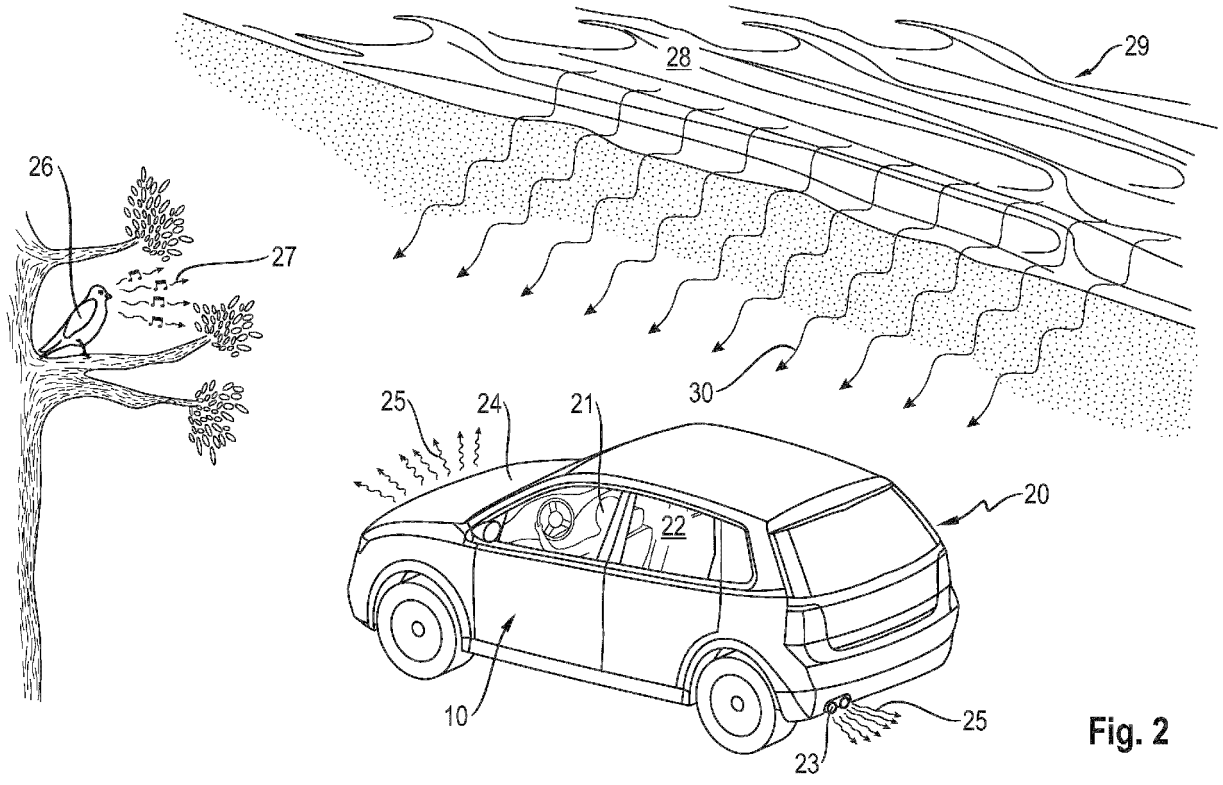

Fig. 2

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Description

[0001] The present invention pertains to a panel for the interior of a vehicle. The invention further relates to a corresponding door and a corresponding vehicle having such panel.

Background art

[0002] DE 102005019204 A1 discloses a device for sound absorption and reduction in the vehicle interior, whereby the sound reduction is represented in a boundary surface to the vehicle interior by means of absorbers.
[0003] DE 102008058169 A1 discloses a noise reduction device which is integrally formed with a wall structure of a motor vehicle, wherein the noise reduction device is designed in the manner of a Helmholtz resonator and thus does not induce any counter-sound.
[0004] CN 108182934 A discloses a noise cancelling device for an aircraft cockpit, wherein the sound reduction unit is located between an interior panel and an opaque exterior structure, and the noise cancelling device cancels the exterior noise by means of counter sound.
[0005] DE 102010021039 A1 discloses a roof of a motor vehicle with a noise cancelling device which reduces the noise level inside the motor vehicle by means of counter-sound from loudspeakers. The noise cancelling device is visibly arranged facing the vehicle occupants.
[0006] DE 102010014819 A1 discloses a noise cancelling device within a vehicle interior for a hybrid motor vehicle, whereby a signal is emitted to the surroundings via external loudspeakers during purely electric driving. By means of the noise cancelling device and loudspeakers, corresponding counter-sound is generated in the interior to reduce the external sounds in the interior, so that the noise level is reduced.

Disclosure of the invention

[0007] The invention provides a vehicle interior panel, door, and vehicle as per the independent claims.
[0008] A concept underlying the present invention is a noise cancellation and isolation device that can be attached to a window and turns the surface into a noise cancelling speaker.
[0009] The invention is based on the insight that such a device being attached to the windows of a vehicle would be a physically intrusive presence. Instead, such a device would be attached and hidden away in between cockpit panels, such as doors that are made of metal or carbon fiber, thus turning these surfaces into noise cancelling speakers.
[0010] Embodiments of the invention are set out in the dependent claims. In a preferred embodiment, the active noise cancelling (ANC) technology according to the invention uses an opaque surface such as of metal. The obvious advantage is to reduce the need to integrate physical sound insulation material which is both costly and adds weight.
[0011] Furthermore, an artificial intelligence (AI) component may be provided by means of which, instead of blocking all sound, the sensor can isolate certain sounds and let them through into the vehicle cockpit depending on the learnt user preference. So, the sensor would act as a gateway for the sounds the user hears. For example, if the user selected 'Sports Mode', this may inform the sensor that the user may also want to hear the exhaust and engine sound, so when this mode is active, the sensor would admit this sound into the cockpit.
[0012] In advanced embodiments, other external sounds such as bird song or ocean waves could also be permitted to propagate into the cockpit, depending on the user's preference.

Brief description of drawings

[0013]

Figure 1 is the partial view of a vehicle.

Figure 2 is a complete view of the vehicle within its natural surroundings.

Embodiment of the invention

[0014] In a partially transparent view, Figure 1 elucidates the driver-side front door (10) of a compact car fitted with interior paneling (not depicted) that contains a microphonic sensor (11) equipped with an AI component. Via the adjacent surface of the door (10), the panel selectively emits an anti-noise in antiphase to any ambient noise that may be captured by the sensor (11). It will be appreciated that instead of the typical metal, the surface may consist of opaque carbon fiber without departing from the scope of the invention.
[0015] Figure 2 illustrates a use case wherein the vehicle (20), on the interior (22) of its door (10), accommodates an occupant (21) behind the steering wheel. Preparing to depart, said occupant (21) expresses her preference for motorsports by arbitrarily setting the vehicle (20) into its so-called sports mode. The AI component learns this preference and isolates within the ambient noise (25, 27, 30) those sounds (25) originating from the exhaust (23) and engine (24) of the vehicle (20), admitting them into the interior (22).
[0016] It is well understood that depending on any pertinent preference of the occupant (21) for natural sounds (27, 30), the song (27) of a bird (26) or, as the vehicle (20) passes an ocean (28), roar (30) of surf (29) may equally be allowed to pervade the door (10) and propagate unto the ears of the occupant (21) so inclined.

Claims

1. Panel for an interior (22) of a vehicle (20), **characterized in that**

   - the panel contains a sensor (11) for capturing ambient noise (25, 27, 30) and
   - the panel is configured to, via an adjacent surface of the vehicle (20), emit an anti-noise in antiphase to the ambient noise (25, 27, 30).

2. Door (10) for a vehicle (20), **characterized in that**

   - the door (10) has a panel as per claim 1 and
   - the door (10) has the surface by means of which the panel is configured to emit the anti-noise.

3. Door (10) as per claim 2, **characterized in that**

   - the surface is opaque.

4. Door (10) as per claim 2 or 3, **characterized in that**

   - the surface consists of metal or
   - the surface consists of carbon fiber.

5. Vehicle (20), **characterized in that**

   - the vehicle (20) has an interior (22) for accommodating an occupant (21) and
   - the interior (22) is fitted with a panel as per claim 1.

6. Vehicle (20) as per claim 5, **characterized in that**

   - the sensor (11) has a component exhibiting artificial intelligence and
   - the component is configured to learn a preference of the occupant (21).

7. Vehicle (20) as per claim 6, **characterized in that**

   - the sensor (11) is configured to isolate certain sounds within the ambient noise (25, 27, 30) and, depending on the preference, admit them into the interior (22).

8. Vehicle (20) as per claim 7, **characterized in that**

   - the vehicle (20) is configured to, at discretion of the occupant (21), temporarily operate in a sports mode and
   - the sensor (11) is configured to, while the vehicle (20) operates in the sports mode, admit the sounds (25) of an exhaust (23) and engine (24) of the vehicle (20) into its interior (22).

9. Vehicle (20) as per claim 7 or 8, **characterized in that**

   - the sensor (11) is configured to, depending on the preference, admit a song (27) of a bird (26) into the interior (22).

10. Vehicle (20) as per any of claims 7 through 9, **characterized in that**

    - the sensor (11) is configured to, depending on the preference, admit a roar (30) of surf (29) of an ocean (28) into the interior (22).

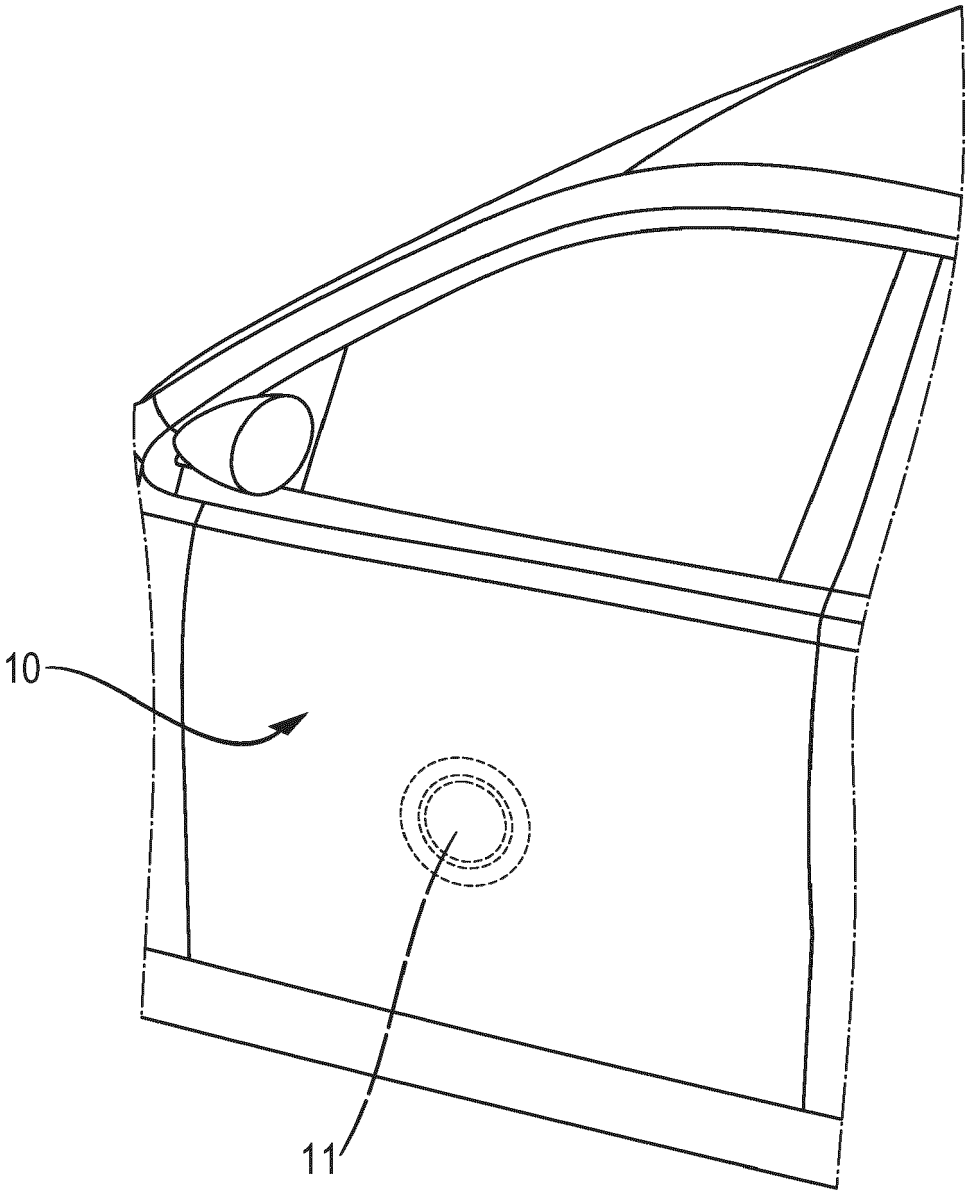

Fig. 1

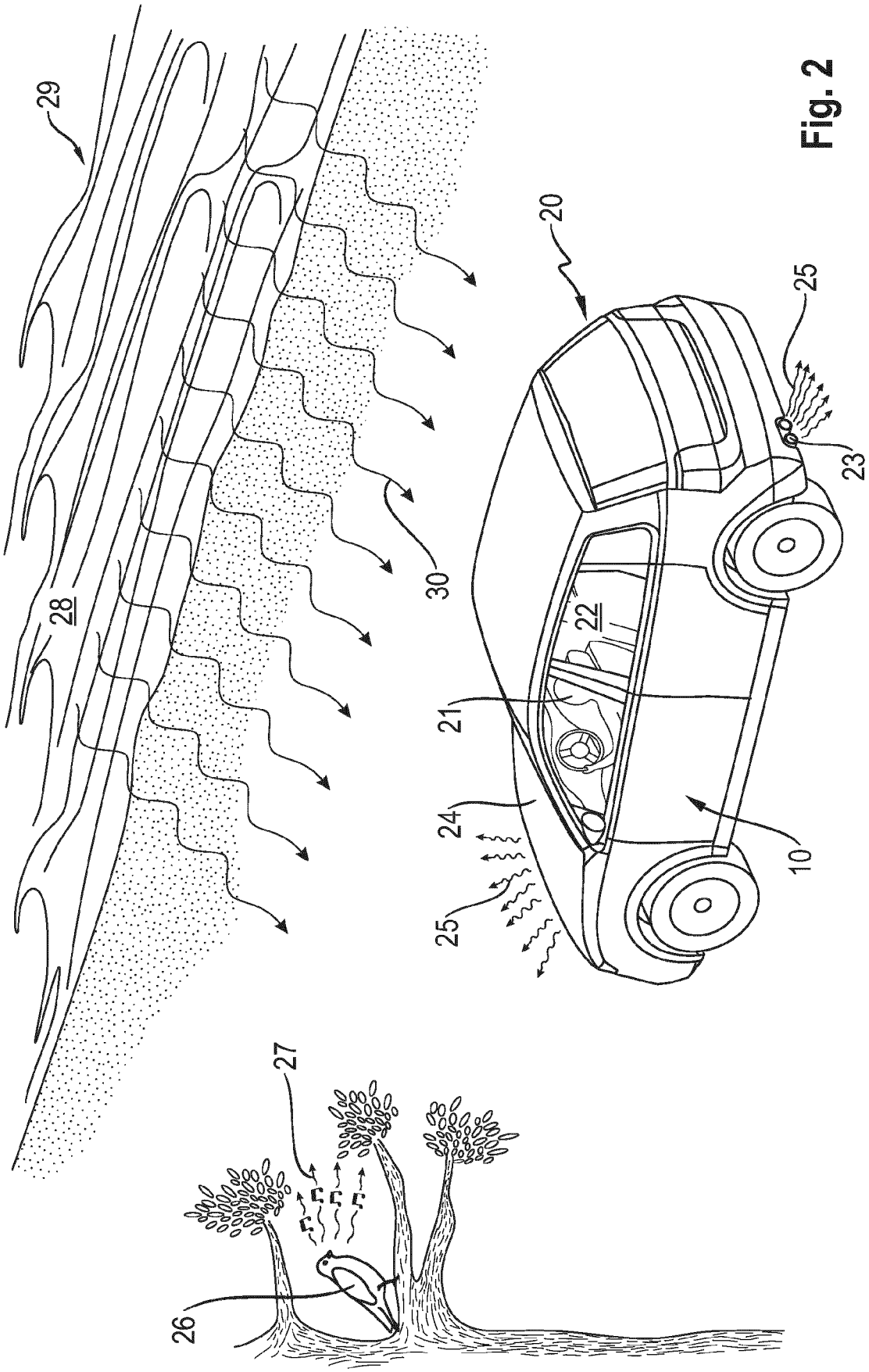

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 22 02 0457

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	DE 10 2020 112871 A1 (BAYERISCHE MOTOREN WERKE AG [DE]) 18 November 2021 (2021-11-18)	1-5	INV. G10K11/178
Y	* abstract * * figures 1-3 * * paragraphs [0005] - [0010] * * paragraphs [0023] - [0038] *	6-10	
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Y	EP 2 876 639 A2 (HARMAN INT IND [US]) 27 May 2015 (2015-05-27) * abstract * * figures 1,3,5 * * pages 2-10 *	6-10	
			TECHNICAL FIELDS SEARCHED (IPC) G10K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 February 2023	Meyer, Matthias

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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