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INSTRUMENT PANEL COOLING BY SUCKING AIR FROM THE PASSENGER COMPARTMENT

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Technical task:
In principle, dark surfaces heat up more in sunlight through light absorption and thus energy absorption than bright surfaces. In the area of the instrument panel of a vehicle cabin, however, dark surfaces are better suited than bright ones to reduce reflections in the windscreen to a minimum and to create as few obstructions as possible in the driver's view.

However, sunlight can cause the dark instrument panel of a vehicle to become very hot. The energy then radiates to the occupants in the first row of seats. This drastically reduces thermal comfort there. A pleasant level of comfort must be achieved by cooling down the ambient air in an energy-intensive manner, whereby the instrument panel surface may also have to be cooled more to avoid uncomfortable radiation.

Initial situation:
The active air cooling of the instrument panel not only creates an energy disadvantage but also an acoustic disadvantage, since the air conditioning fan has to work harder than in stationary cooling mode. In order to make the radiation of the instrument panel comfortable, an additional, stronger air flow may have to be routed over the instrument panel, which in turn can generate draughts in the occupants.

Solution:
The new idea involves the large-scale intake of indoor air through a perforated instrument panel.
The foam beneath the instrument panel surface is to be designed with open pores so that the sucked-in air can flow through it without having to provide explicit air ducts.

If the vehicle is exposed to direct sunlight from the instrument panel for an extended period of time, the average cabin interior air will be considerably cooler than the instrument panel surface heated by radiation. By sucking in the cabin air, the instrument panel can be cooled considerably. This increases comfort, as occupants are irradiated less by the heated instrument panel surface.

By sucking in the air over a large area - instead of blowing it out via the instrument panel surface - there is no inertia-related wake of the flow, so that no draught can arise for the occupants. Likewise, the air in the cabin does not have to be pre-conditioned. The device can therefore be operated independently of the air conditioner.

The instrument panel support must have a distribution channel system with an open-pored foam on top. The interface to the interior provides a perforated slush skin.

It makes sense that the air intake through the instrument panel is also operated as a preconditioning measure to improve the ease of entry. This means that the instrument panel can be cooled down before entering the vehicle (at least to the cooler current cabin air temperature).

Advantages:
- The thermal interior comfort can be increased without acoustic and energetic disadvantages.
- The system is quiet, draught-free and easy to integrate.