INTELLIGENT WINDSHIELD CLEANING SYSTEM

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Technical task:
The object of the technical innovation is to realize an effective window cleaning by means of a new system.

Initial situation:
The cleaning of the windshield is usually carried out during the ride with mechanical windscreen wipers and liquid additives in the windscreen washer tank. Especially in the summer months and during night driving their cleaning effect is insufficient. A large number of different insects cover the field of vision when striking the front windscreen, thus making the view clear. The cleaning variants for the removal of these dirt particles are very complex, expensive and time-intensive.

Solution:
The technical innovation provides for a series of measures to keep the front disk and, if appropriate, also the cover disks of headlamps clear of impurities:
- Detection of intensified insect flight via the onboard camera of the assistance systems
- Electrical exhaustion or transfer of the excess engine / exhaust heat under the hood and
- Electrical acceleration of the air masses in the direction of the front windscreen resp. Headlight front
- Temperature control of the outflowing air
- Air exhaust control in front of the front windshield, front of the front windshield, comparable to a high-performance blower, such as electric Hand dryers in public washrooms, but with speed-dependent angle of attack and extremely flat air nozzle with additional electrical adjustable, variable breaker height.

In summary, the three stations:
- Dissolve the body / element structure of insects or dirt,
- Change or soften the molecular structure with cleaning liquid,
- Cleaning and discharging by blower high pressure

This means that the two first working steps are predominantly carried out before the dirt or insects hit the front disc and the final cleaning with the dissipation of the dissolved soiling is carried out on the front disc.

The technical implementation in detail:
The „cleaning air“ is sucked in from the warm engine compartment environment or the ambient air under the hot front flap. This air is forwarded in the direction of the front windscreen in special airflow ducts, which are provided with injectors for cleaning liquid. The injection of water, possibly with cleaning liquid, takes place before the high-performance blower. This leads to a liquid mist by means of swirling. At the end of the air ducts, the electric high-performance blowers with electrically oscillating control of the exhaust nozzles are located in front of the front disc in the area of the driver’s and passenger’s visual fields. The latter influence the angles of incidence in the x-y-z direction and thus act as a rotating „insect or dirt milling machine“. The simultaneous control of the outflow speed is also oscillating. By means of the oscillating gap width variation of the air outlet nozzle, the outflow speed can be changed in a pulsating manner and the effect of a flow separation in front of the front disc is advantageous in that the insects or the dirt are „torn off“. By means of an electric high-performance blower with a characteristic field-controlled outflow speed of up to 690 km / h, a warm airflow is passed from the engine compartment. This characteristic control system contains all CAN messages and environmental conditions of the control units involved (engine, heating-air conditioning, assistance systems ...). In front of an oscillating air flap adjustable in the angle of incidence, water or cleaning fluid is injected into the warm airflow channel under the bonnet in front of a high-performance blower so that the insects are partially destroyed by the liquid molecules in their filigree body structure before they are hard on the dry front disc incident.

Furthermore, in front of the oscillating air flap, which is adjustable in the angle of incidence, water or cleaning fluid is injected into the warm airflow channel under the hood in order to soften the body-borne liquid of the insects (persistently adhe-ring proteins) in their molecular structure. The whole system allows an intentionally rotating and pulsating thin liquid film to float over the front disc with water or cleaning fluid to rinse the insects impinging in the air stream onto the front disc over the liquid film and discharge it upwards over the vehicle.

Advantages:
- More security through better visibility.
- Time / cost optimization with car care and cleaning.
- Longer life of windscreen wiper blades.
- Possibly also in the rear wiper area, then lighter construction or even elimination of the rear window wiper.

Possible application:
- All vehicles with various environmental sensors and CAN-bus.

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Technical innovation

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