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ELECTROMAGNETIC INDUCTION FOR ACCELERATION AND DECELERATION OF VEHICLES

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Technical task:
The invention makes it possible to brake or accelerate vehicles by electromagnetic induction.

Initial situation:
In 2017, vehicles have an average weigh of 1,420 kg (new registrations in Germany). Electric vehicles are even heavier due to battery technology. At 100 km/h this is a kinetic energy of E kin = ½ mv^2 = ½ x 1,420 x 27.77 x 27.77 = 547 kJ. When accelerating (e.g. when entering a motorway) this energy is demanded by the engine. When braking (e.g.: motorway exit) this energy cannot be conserved for the most part. Such situations also occur at toll stations, border crossings, bridges, tunnels, car ferries, entrances and exits, traffic lights, etc. The braking energy can only be "used" by electric vehicles and only partially (regenerative braking). Conventional vehicles dissipate this energy into heat, it contributes to wear and tear of the braking system and generates fine brake dust. The energy required for acceleration increases energy consumption and thus reduces the range. The vehicle motors and transmissions must be dimensioned for this acceleration phase in relation to the vehicle weight. The motors are oversized for the remaining period of use (main usage period). As a result, they are heavier and more expensive and consume more energy in main operation. As the vehicles brake and accelerate differently depending on vehicle performance, driver, driving skills and driver attention, collisions occur. The roads are more heavily used in places where braking or acceleration is applied.

Solution:
The vehicles can be accelerated and braked using electromagnetic induction. At the above-mentioned points, the infrastructure below the roadway provides the necessary devices (see Possible application). The vehicles are equipped with the necessary devices to absorb and release kinetic energy (see Possible application).

Advantages:
- The braking energy can be reused e.g. for acceleration from the vehicle
- The vehicles have less consumption and wear and tear
- All vehicles can benefit from the technology (including non-electric vehicles)
- The use of the energy obtained is particularly efficient because it can be used directly where it is generated (less loss through transport)

Possible application:
Hardware for the infrastructure:
Acceleration lane: A coil system is installed underneath the roadway at a distance of several hundred meters before and after the above mentioned locations. The coils can be energized to provide an alternating north and south row. If vehicles with a corresponding device (see hardware for the vehicles) drive on such a roadway, they are driven forward.

Energy recovery lane: A coil system is installed below the roadway at a distance of several hundred meters before and after the above mentioned locations. When vehicles with an appropriate device (see hardware for the vehicles) drive on such a lane, they are braked and electricity is generated. The electricity generated in this way can be fed into energy storage devices and used, for example, to power the acceleration lanes.

Hardware for the vehicles:

A suitably equipped vehicle or several vehicles coupled with a corresponding device (see invention report E25786 / patent application: 16/402326 / title: Mobile charging device for an electric vehicle) have e.g. two coils or use 2 superconducting magnets (one south and one north).

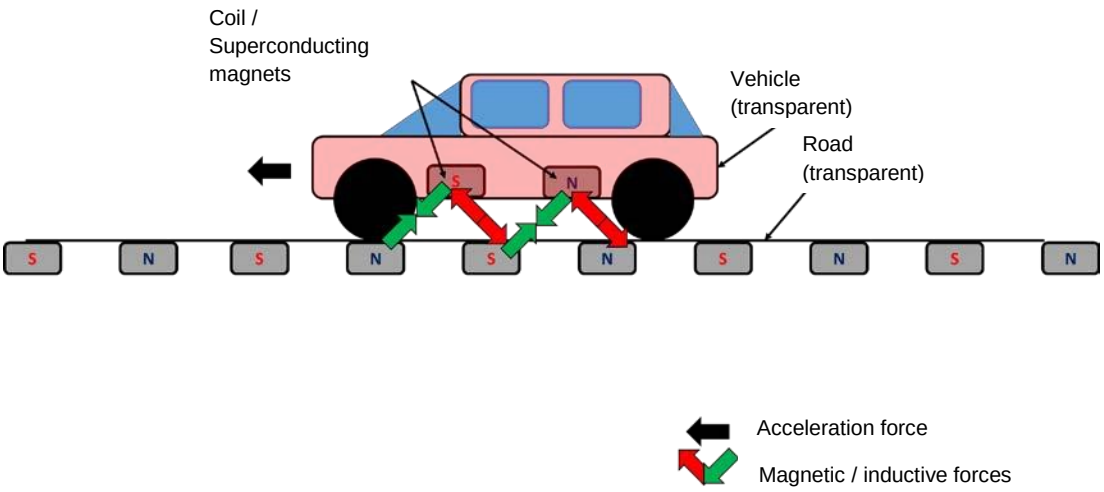

Figure 1: Acceleration

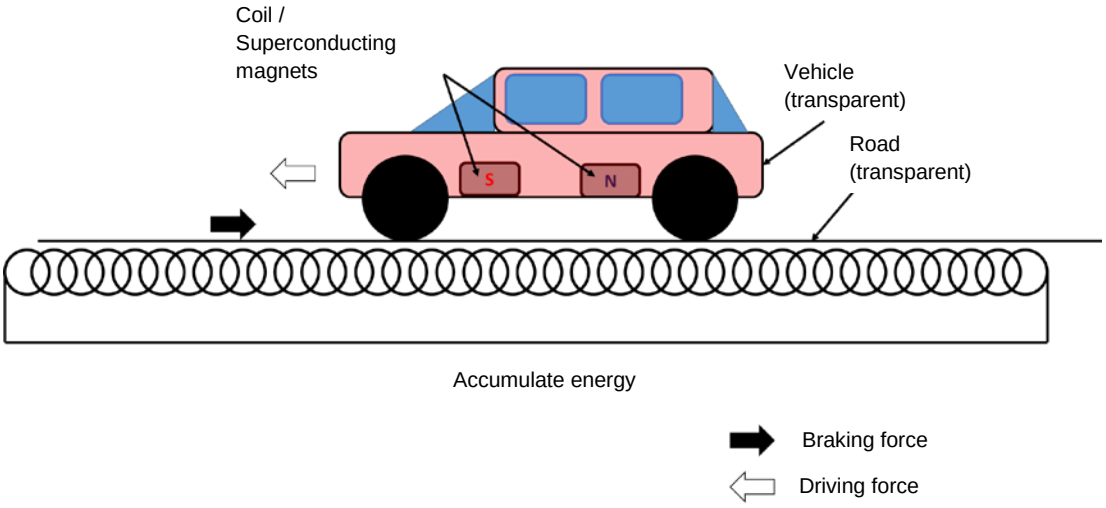

Figure 2: Deceleration