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## INCREASING TYRE PRESSURE WHILE DRIVING AT HIGH SPEEDS (SYSTEM TO INCREASE DRIVING SAFETY).

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## INCREASING TYRE PRESSURE WHILE DRIVING AT HIGH SPEEDS (SYSTEM TO INCREASE DRIVING SAFETY).

### Today's status:

Tyre pressure control systems are basically known for controlling the tyre pressure in vehicles with pneumatic tyres. These systems are often used on commercial vehicles, agricultural machinery, off-road vehicles or military vehicles. The purpose of these systems is to increase the off-road capability of the vehicles. The systems are often controllable from inside the vehicle (tyre pressure increase and decrease) and consist of the following main components: Control unit, compressor, supply lines and adapted rims with hollow axle.

### Disadvantages:

The known tyre pressure control systems have several disadvantages:

- Large number of components and therefore
  - large installation space requirement (thus difficult to implement in passenger cars).
  - cost-intensive
- Systems are designed to increase off-road mobility
- Usually active control via the passenger compartment necessary

### Solution:

The invention focuses on a greater spread between driving safety at high speeds and driving comfort at low speeds. At high speeds, a higher tyre pressure is advantageous for driving safety. At low speeds, a lower tyre pressure is advantageous for driving comfort. The invention increases the tyre pressure automatically while driving if a defined speed is exceeded.

For this purpose, a pressure container is mounted directly on the rim, the outlet of which is connected to the inside of the tyre via the rim (see Figure 1). The pressure tank is accessible from the outside and easy to change. The reservoir can be attached to the rim, for example, by means of a screw connection or a bayonet lock.



Figure 1: Exemplary positions of the pressure reservoir (blue) integrated into the rim.

The connection to the inside of the wheel is shown in the sectional view in Figure 2.

A connection leads from the pressure tank to the inside of the tyre. At the end of this connection line is a spring-loaded valve. The purpose of this valve is to allow gas to flow from the pressure tank to the tyre interior only when desired. The spring in the valve is designed in such a way that the valve only opens at a set speed. This makes use of the centrifugal force acting on the ball (or a plate) in the valve. As the speed increases, the centrifugal force on the ball also increases. The valve remains closed until the counterforce of the spring is overcome and the valve opens. The desired limit speed can be adjusted both via the installed spring (with different spring forces) or with balls (or plates) of different weights. In this way, the desired speed at which the valve opens can be set in a simple way.

After opening the valve, gas flows from the pressure tank towards the inside of the tyre until  $P_2=P_1$ .

This causes the pressure in the tyre to increase.

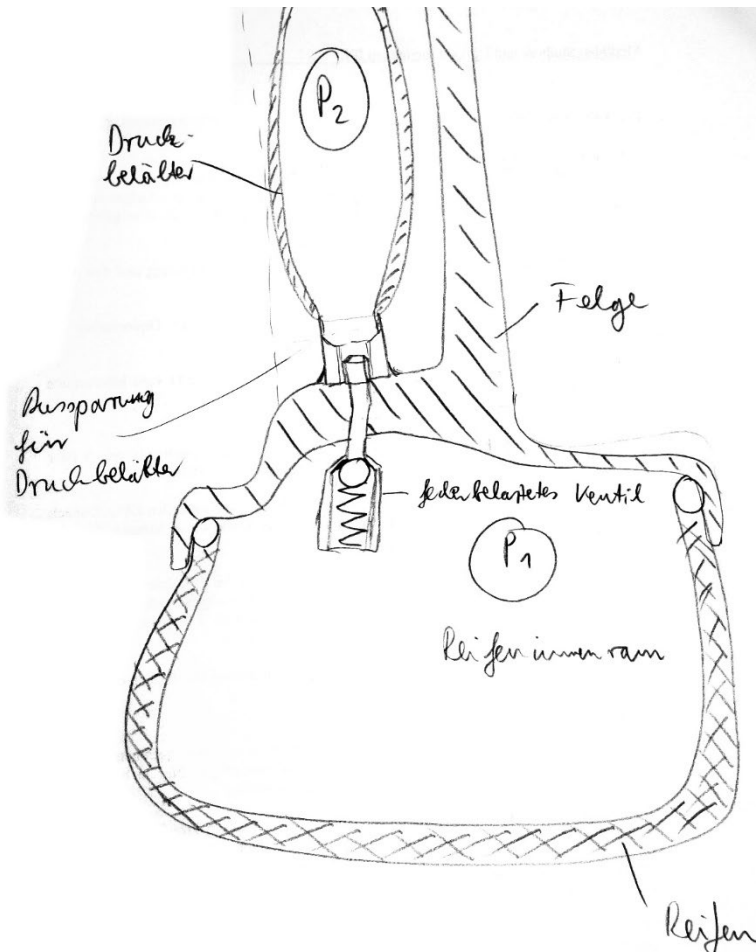


Figure 2: Sectional view

Replacing the pressure vessel can easily be done without dismantling other components.

**Advantages:**

- Simple system for increasing tyre pressure at high speeds.
- Driving safety is increased
- driving comfort at low speeds
- low modification effort (only adaptation of the rim)
- No use of additional space in the vehicle
- Simple change of pressure reservoir possible
- System works automatically when the speed limit is exceeded