

Description

TIRE WHEEL CAPABLE OF TWO PHASES OF AIR PRESSURE

Background Art

- [1] The air amounts of the tires of all vehicles usually are fixed at certain values regardless of their movements, or, road conditions, or, weather conditions.
- [2] So, the air pressure of a tire fluctuates in accordance with the temperature, and, for some reasons such as accidental leaks, tires will deflate. In that case, we have to change the air amount of the tire to keep the proper air pressure by injection or takeout.
- [3] But, the proper air pressure we make efforts to keep is not an ultimate one for all situations. Rather, it is a compromised one. So, if we have some special purposes of a tire in our minds, we are obliged to use different types of tires.
- [4] Typically, when the tire pressure is low, the fuel mileage is degraded, but the traveling distance on a sudden braking is reduced. On the contrary, when the tire pressure is high, the fuel mileage is improved at the cost of an aggravated braking distance.
- [5] Accordingly, we are supposed to inject a proper amount of air on the compromise of good fuel mileage and short braking distance, and the tire pressure is maintained invariantly.
- [6] However, at a very high speed, we must increase the pressure of a tire in proportion to the load and the speed of a vehicle to prevent the tire from getting damaged by the accumulated heat caused by its deflection or, to an extreme, bursting.
- [7] Because tires hydroplane in proportion to the speed of a vehicle and the size of the area of the ground-touching surface, we must increase the pressure of a tire to keep a good traction on a wet road. But, on the road covered by snow, it might be an only effective way to stop on a sudden braking that we deflate tires excessively so that would-be spikes attached to the tire wheel can exert their forces on the ground. Also, by being operated like that, the spikes don't carry a discomfort on a normal road.
- [8] This invention makes it possible that tires have the optimum pressures dependent on the driving conditions, the weather conditions and the road conditions, and the pressures can be changed instantaneously.
- [9] Once a tire is installed, no human intervention for the maintenance of the pressure is required for the lifetime of it. Consequently, the tire can have inert gas like helium distinct from air that may burn the inner material of it.

Description Of Drawings

- [10] A pair of devices of this invention are installed on the wheel inside tires.
- [11] The device not only regulates the pressure of the tire, by spouting some amount of gas from the hyper-pressure chamber or by taking back some amount of gas into it,

according to the condition of the temperature, the load on the tire, the speed of the tire, or the accidental leak, but also adjusts the tire pressure to the optimum instantaneously, by the operation of the vacuum cylinder and the hyper-pressure chamber, on the situation of a sudden braking or a sudden change of a road condition.

[12] Figure 1 is the simplified drawing of the tire wheel that is capable of two phases of air pressure.

[13] Figure 2 describes in detail the pressure regulator 2 in Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

[14] This device is comprised of three parts of a vacuum cylinder 1, a pressure regulator 2, and a hyper-pressure chamber 3 on a rough view, and, the piston 4 in the cylinder 1 is connected by a linear gear 5 to the regulator 2 and the chamber 3 is connected by a pipe 7 to the regulator 2.

[15] As the tire rolls and the bar 6 is pressed against the ground, the linear gear 10 spins the outer gear 8 partially and the linear gear 11 spins the gear 9 partially.

[16] When the outer gear 8 spins, if the inner gear 14 is latched by the electromagnetic switch 12, it rotates clockwise and is kept by the one-way electromagnetic stopper 13 and the linear gear 5 moves pulling the piston 4.

[17] The position of the piston 4 becomes known by the counting sensor 15 and so, when the piston reaches the required position, the inner gear 14 is unlatched by the switch 12 and does not rotate anymore.

[18] As the piston 4 is pulled, the overall tire pressure goes up.

[19] When the stopper 13 releases the inner gear 14, the piston 4 returns and the overall tire pressure goes down.

[20] When the outer gear 9 spins, if the inner object 17 is latched by the electromagnetic switch 18, it rotates counterclockwise and is kept by the electromagnetic stopper 19.

[21] The outer gear 9 returns by the force of the plate spring 20 when the bar 6 gets away from the ground.

[22] The position of the piston bar 23 becomes known by the access sensor 22 and so, when the pump piston 24 reaches the bottom of the pump cylinder 25, the inner object 17 is unlatched by the switch 18 and unlocked by the stopper 19 and it returns by the force of the plate spring 21.

[23] When no more pumping action is required, the switch 18 is kept unlatched and the object 17 is locked by the stopper 19 and, by the operation of the combination of the object 17 and the outer gear 9, the alternator of the inside generates the electricity to charge the battery 26.

[24] When no more action of the bar 6 is required, the one-way electromagnetic stopper 16 locks the outer gear 8 and consequently, the bar 6 is kept at the bottommost position.

- [25] When a sudden inflation on the tire is needed, the electromagnetic gas stopper 31 lets out the required amount of gas through the pipe 32.
- [26] When the gas is spouted through the nozzle 34, it exerts the spinning force on the concaves 33 on the gear 14.
- [27] So, if needed, the vacuum cylinder 1 is charged to a certain degree and since then, the regular charging method by the motion of the bar 6 is used and the resulting extra amount of gas is taken back into the chamber 3 by the operation of the piston 24.
- [28] By the counting direction sensor 35, the displacement of the bar 6 between the top and the bottom is measured and the load on the tire is weighed indirectly.
- [29] By the centrifugal force sensor 30, the speed of the tire is measured and by the sudden change of the speed, the sliding state of the tire or the braking force can be sensed.
- [30] The tire pressure is measured by the pressure gauge 28 and the pressure of the chamber 3 is measured by the pressure gauge 29.
- [31] All data are sent to the electronic controller 27 and it controls all parts by the decision based on them or the order from the central unit in the room of a vehicle.
- [32] The controller 27 also reports the state of the tire to the central unit.

Claims

- [1] A tire wheel that regulates the pressure of a tire, and that adjusts it to the optimum instantaneously on two phases of the movement of a vehicle.
- [2] The tire wheel recited in claim 1 comprises a pair of devices, and each one is comprised of a vacuum cylinder, a pressure regulator, and a hyper-pressure chamber.
- [3] The vacuum cylinder recited in claim 2 elevates the overall pressure of the tire by going into a vacuum and lowers it by return.
- [4] The hyper-pressure chamber recited in claim 2 regulates the tire pressure by spouting some amount of gas from it, or by taking back some amount of gas into it.
- [5] The pressure regulator recited in claim 2 is comprised of a power supplier, a concentric double gear driven by said power supplier, a combination of gear and alternator driven by said power supplier, a linear gear, driven by said concentric double gear, that charges said vacuum cylinder, a pump, driven by said combination of gear and alternator, that charges said hyper-pressure chamber.
- [6] The inner gear of the concentric double gear recited in claim 5 is also driven by the force of the spouting gas from said hyper-pressure chamber.
- [7] The power supplier recited in claim 5 produces the needed force by the pressing force of the ground when the tire rolls.
- [8] The load on the tire is weighed indirectly by measuring the displacement of said power supplier caused by the deflection of the rolling tire.
- [9] The speed of the tire is measured by a centrifugal force sensor, and by the sudden change of the speed, the sliding state of the tire or the braking force is sensed.