METHODS OF IMPROVING THE SUPPLY SYSTEM OF GAS CYLINDER VEHICLES

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Annotation. This article analyzes the gas supply system cars with gas cylinders, its principle of operation and the types of gas equipment installed in cars.

Key words: car, engine, supply system, compressed natural gas, gas cylinder, safety, gas equipment.

After the independence of our republic, the automobile industry began to develop rapidly in our country. The number of cars is increasing day by day. This, in turn, gives the automotive industry, which is considered one of the main directions of economic and social development of our country, the task of increasing and improving the production structure of cars that meet all the requirements of the national economy and emit less harmful substances to the environment, as well as with high fuel efficiency. loads[1].

The increase in the demand for gasoline and diesel fuels, which are used as vehicle fuel, requires the use of alternative fuels. Nowadays, cheap natural gas is widely used as fuel for cars. Our republic has many reserves of natural gas, and these reserves contain high-quality natural gases that can be used as fuel for automobile engines directly, without the use of excess gas processing or chemical treatment technologies. can be used as fuel [3]. In addition, natural gas used as motor fuel is much cheaper compared to other types of fuel. Therefore, approximately 70-80% of cars in our republic run on natural gas [2].

In addition, natural gas used as motor fuel has several advantages over petroleum products. When using them, high technical and economic indicators of the engine are achieved, because natural gas has very good anti-detonation properties, the

property of forming a mixture with air is very good, and it can form mixtures with air in any ratio. In gas engines, the mixture burns almost completely, and the environment is less harmed due to the fact that the toxicity of the used gases is much lower.

According to the main units and engine systems, the degree of integration of compressed gas vehicles with gasoline engine vehicles in current production is on average 90%. Therefore, switching to gas fuel does not require a radical change in the design of cars with mostly carburetor and injection engines [4]

Compressed natural gas is a gas under normal conditions at any pressure, and it mainly consists of methane and hydrogen. Methane is compressed to a pressure of 20 MPa and stored in thick-walled cylinders. The use of gases eliminates the washout of the oil film from the walls of the piston and sleeve, reduces the formation of soot in the combustion chambers, due to the absence of gasoline vapors, the oil on the walls of the cylinder liners does not burn, as a result, the life of the engine and the oil change period are 1.5 - Extends by 2 times.

However, in gas cylinder vehicles, the supply system is complex, and the requirements for fire and explosion safety are high. Gas engines have 10-20% less power than carbureted engines because gas takes up more volume when mixed with air than gasoline.[2] Also, one of the main disadvantages of natural gas as a motor fuel is the low volume concentration energy. If the heat of combustion of one liter of liquid fuel is 31426 kDj, this value for natural gas under normal conditions is 33.52–35.62 kDj. At first, high pressure should be compressed to 20-25 MPa, which requires the use of special compressor devices[3].

The use of gas fuel reduces the total amount of harmful carbon monoxide, nitrogen dioxide and hydrocarbons in the exhaust gases from the engine. In particular, used gas does not contain any lead at all.

The toxicity of exhaust gases is 3 times less when burning gas fuel than when working with gasoline, the level of noise emitted by the engine when the operating mode is selected correctly is low, and this condition is especially important in urban conditions [2].

Conversion of carburetor or injector engines to gas fuel allows them to work on two different fuel systems, i.e. on gas and gasoline fuels. The use of two fuel systems helps to increase the total power reserve of motor vehicles and expand their size.

With the increase in the number of vehicles running on gas fuel, it is necessary to improve the gas equipment and the fuel supply system of cars running on gas fuel. Currently, the following 4 generations of gas equipment are installed in cars running on gas fuel in our republic.

1st generation GBU. It appeared in the 70s of the 20th century and is mainly designed for carburetor engines.

2nd generation GBU. Carburetor engines were replaced by injector engines, and manufacturers first tried to adapt gas equipment to the new injector cars without changing the design.

The second generation gas equipment works the same as the first generation, but instead of the vacuum valve, an electromagnetic valve is used. With the help of an electromagnetic valve, it will be possible to switch from one type of fuel to another, using a button to select the desired type of fuel.

3rd generation GBU. It began with the appearance of serious changes in the operation of gas devices in cars. The main difference of the 3rd generation GBU from previous generations was the appearance of an electronic system for controlling and adjusting the fuel supply. As a result of the equipment of this generation installed in cars equipped with a computer and controlled by an electronic control unit, it was possible to reduce fuel consumption and increase efficiency, as well as reduce the amount of exhaust gases.

4th generation GBU. Today, it is the most common version of gas devices (90% of car owners prefer this system). Despite having a relatively simple structure, it has excellent technical characteristics.

The advantages of gas equipment of this generation are as follows :

(Figure 1)

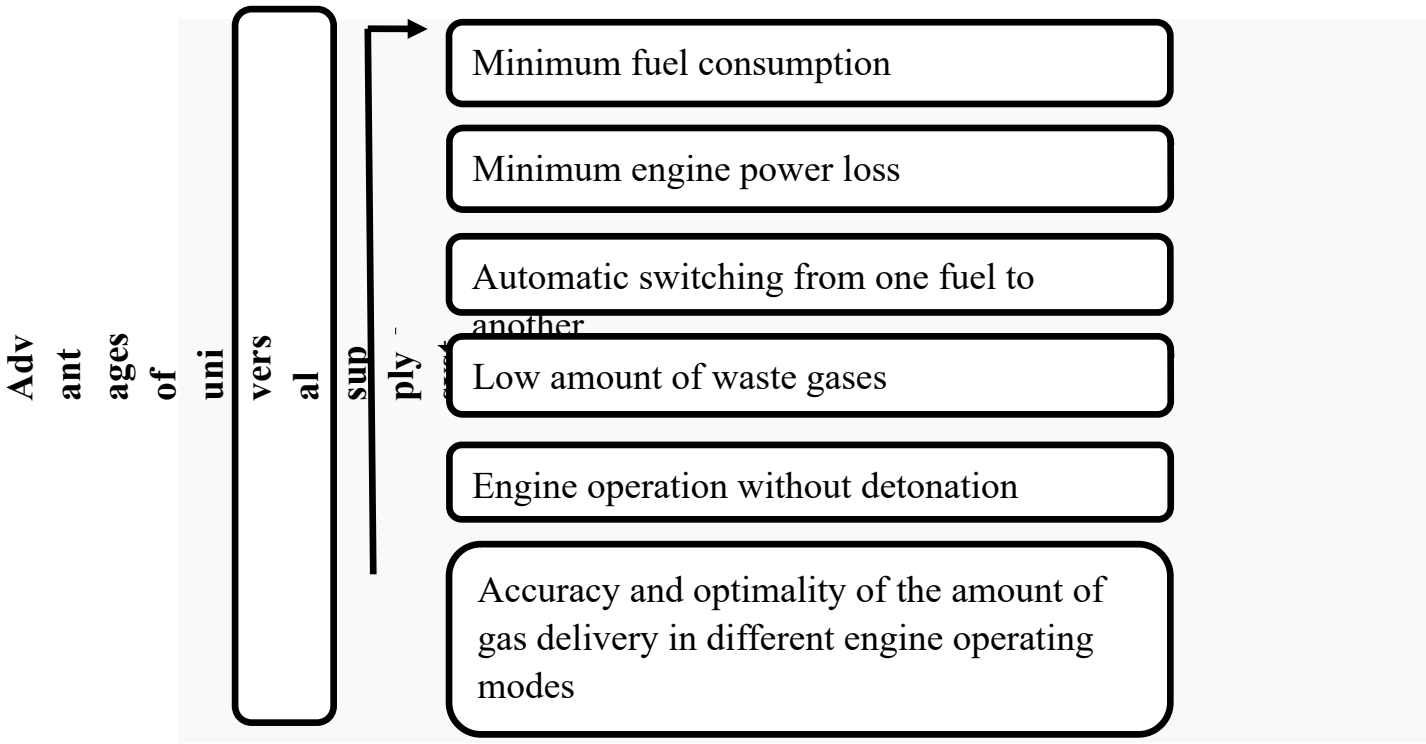

Figure 1. Advantages of 4th generation gas equipment.

The distinguishing feature of this generation from the previous ones is the presence of an injector for each cylinder, which provides the gas mixture necessary for the engine to work at high power. The operation of individual injectors is controlled by an electronic control unit. This gas equipment provides the engine with high efficiency (up to 50%) with low power loss.

It is necessary to install modern gas equipment in cars in order to achieve good performance and high efficiency of the supply system of gas cylinder cars and to reduce the amount of toxic gases released into the air.

As a result of installing the 4th generation gas equipment in the engine, the engine power increases, the fuel mixture is distributed at the same rate for each cylinder, the fuel consumption decreases due to the accuracy of the fuel transfer dose, and the amount of toxic gases released into the environment decreases, the engine ((of the car) leads to improvement of dynamic characteristics, reliable engine start-up and quick return to normal engine operation mode. As a result of this technology in the automobile industry of our country, it is possible to reduce harmful gases by four times and save 70% of gasoline.

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