Fuel System Types for Modern Vehicles

Zingirov Saydolim Jurayevich — Senior teacher- Andijan Machine building Institute,Andijan city,Uzbekistan

Ulkanov Sardorjon Sodiqjon ugli — Assistant- Andijan Machine building Institute,Andijan city,Uzbekistan

ABSTRACT

One of the most urgent issues is to reduce the amount of toxic gases released into the environment and transition to an alternative fuel supply system. The following countries are conducting scientific research on modern carburetors and injectors.

Keywords: fuel systems, injection, pump, motor, power.

Figure 1. The following countries are conducting scientific research on modern system

The fuel system of any car is responsible for the timely supply of fuel to the combustion chamber. The types of fuel systems of a car have many common components and many differences. Today, several systems are distinguished, which we will consider in detail in the article.

Figure 2. Fuel systems of a gasoline unit

The operation of a gasoline engine is based on the process of converting energy, which is released during the combustion of fuel assemblies (fuel), into mechanical energy. The process becomes more complicated if effective fuel preparation and its subsequent supply to the cylinders are not provided. For this, the fuel system is responsible, which has undergone several useful upgrades on gasoline units[1]

Carburetor.

The most complex and outdated vehicle today. Implies the presence of a carburetor. This unit prepares the mixture in gasoline internal combustion engines[2]. In such a system, there are quite a few subsystems in which the fuel-air mixture is prepared for different modes of operation of the motor.

Despite its structural obsolescence, the carburetor vehicle has some advantages. For example, the cheapness of this type of fuel equipment. It is not necessary to install an expensive and complex injection pump (high pressure pump) in carburetor fuel systems.

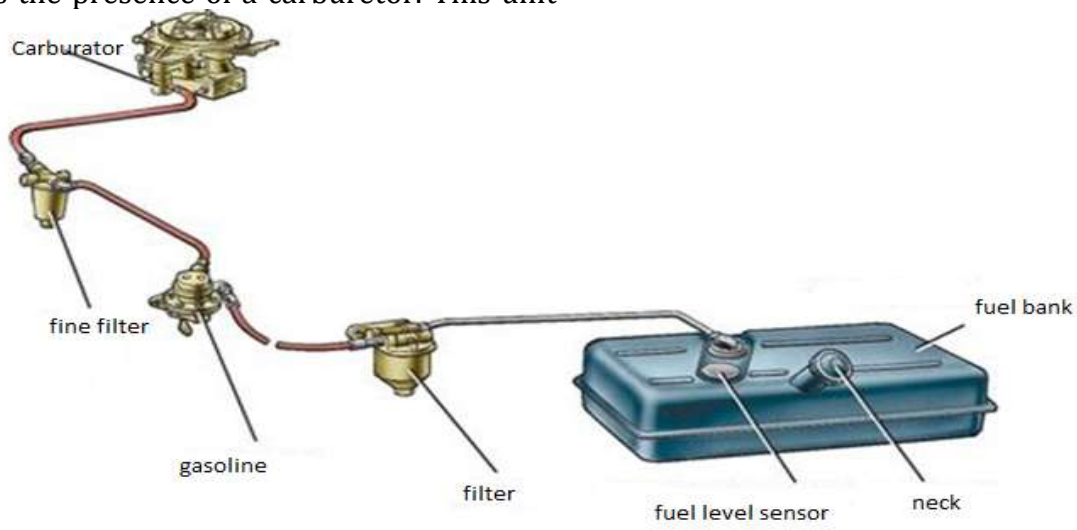

Figure 3. Carburetor systems

As for the disadvantages, they are related to the service. Behind the carburetor you need an eye and an eye. In winter, for example, only an experienced driver can tune the system so that it does not fail at the most unexpected moment. Starting the engine, if the carburetor vehicle is tuned a little bit wrong, becomes much more difficult[3].

Mono-injector vehicles

More modern power systems called mono injection. Here, the carburetor is no longer needed, its role is successfully performed by a sprayer equipped with only one nozzle[4]. The fuel is sprayed at the moment when the motor sucks in the air streams. A mono-injector vehicle, like a carburetor vehicle, is installed only on gasoline engines. An injection pump is necessary in such a system; a return line (return line) is also needed. The system is equipped, among other things, with an internal combustion engine control unit, which is responsible for the dosage of fuel[5]. The block is based on information sent to it by several sensors (DMRV, DTD, etc.). Obviously, monophonic injection is structurally more expensive than a carburetor vehicle, but the engine starts easier in cold weather and works more stable, which helps the owner recoup the cost of a new car system, saving on maintenance costs.

Injection vehicles with multipoint injection.

Improvements to perfect fuel systems don't stop with mono injection. Distribution or multipoint injection was invented. If earlier there were reasons to scold the new injection system for one-sidedness, now everything has been modernized to the limit. Injectors were now installed near each cylinder of the internal combustion engine. The rest of the system repeats the principle of operation of the mono-injector, but allows you to achieve new heights regarding environmental standards. The stability of the engine has also increased significantly, and fuel consumption has decreased. But the cost has increased[6].

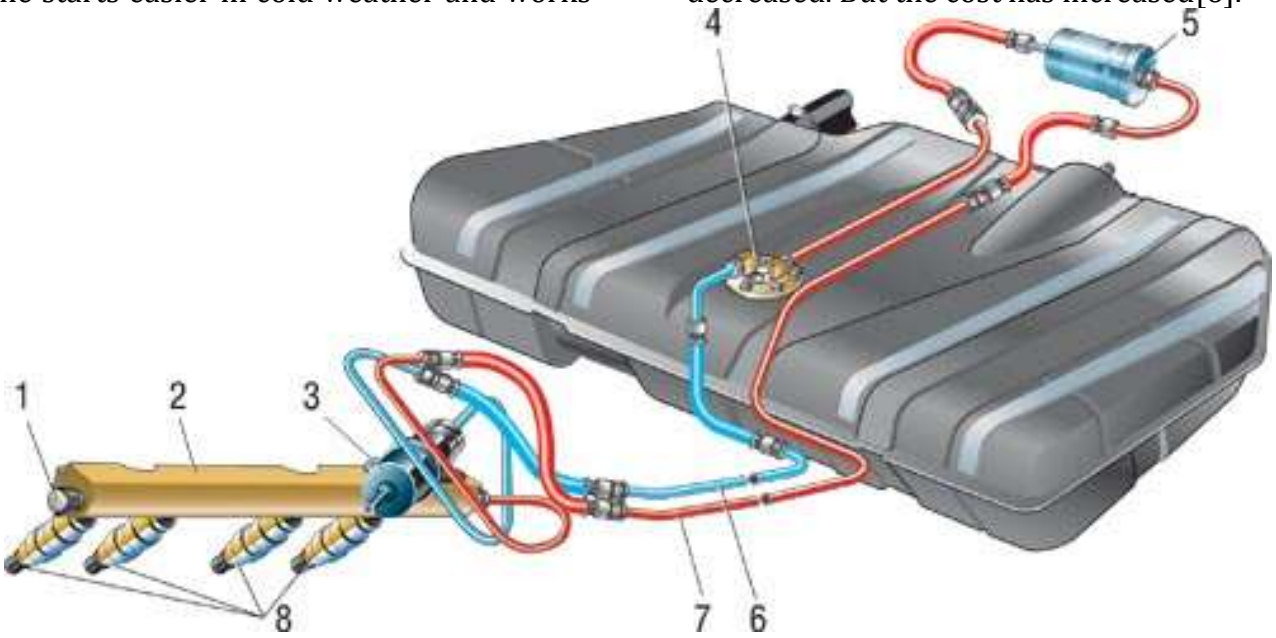

Figure 4. Injection systems

Direct injection injector.

This is already the crown of the development of gasoline vehicles. This time, the fuel is sprayed in the injector by nozzles that are installed directly in the cylinder. The new solution allowed designers to achieve a reduction in fuel consumption by as much as 20 percent. In addition, technical indicators and engine power have increased[7]. The disadvantage of the new imophonic injection system is called the high cost, excessive demands on the quality of fuel, dependence on all kinds of pumps (one injection pump is not enough here). Low pressure pump or low pressure pump is installed in cars with direct injection along with high pressure fuel pump. The principle of operation of the injector is associated with the forced injection option. The fuel supply is carried out strictly under pressure so that the gasoline is sprayed. This allows fuel vapors to mix with air molecules. Thus, any injection system should consist of two subsystems: air and fuel. The first, as you might guess, provides air supply, the second - gasoline. The air subsystem is an extensive duct with a filter at the end. The task of the latter is to clean up impurities. The channel is directly connected to the intake manifold, which goes to the timing

valves of the system. The power unit draws in air at the time of the stroke when the intake valve opens. At the same moment, the fuel subsystem turns on, injecting fuel.

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