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FUEL ATOMIZER FOR INTERNAL COMBUSTION ENGINES

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Fig. 1

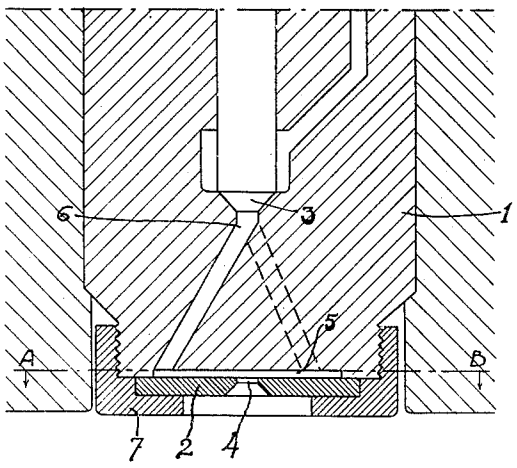
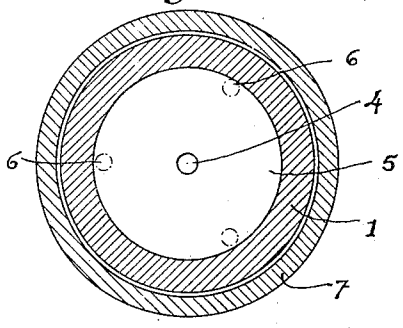


Fig. 2



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FUEL ATOMIZER FOR INTERNAL-COMBUSTION ENGINES.

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In internal combustion engines for liquid fuel which is injected directly into the cylinders, i. e. without the aid of compressed air or the like, there are several drawbacks due to the hitherto used constructions of the fuel injecting device. Such drawbacks are for instance powerful increases of the pressure within the cylinder at the ignition which are due to the fact that the ignition takes place only after a relatively large portion of the fuel has been injected into the combustion chamber, and, moreover, that the relatively small hole in the injecting device is stopped up either by solid impurities in the fuel or by the formation of coke, and finally that it is difficult to start the machine in a cold state.

In order to avoid these drawbacks a fuel atomizing or injecting device has been proposed in which two or more fuel channels meet in front of an outlet opening so that the fuel streams being forced through these channels will atomize one another so as to form fine fuel particles in front of the outlet opening or openings.

However, this fuel atomizer which no doubt is advantageous in several respects, suffers from several inconveniences, chiefly this that the outlet opening is subjected to a great deal of wear in front of the fuel channels, so that the same, if it is provided with for instance two channels, becomes oval after the atomizer having been used for some time. Moreover, the risk of the fuel channels being stopped up by solid impurities so, that the fuel atomizer is put out of work, is still at hand.

According to my present invention there is also, on the inside of the fuel outlet, located an intermediate chamber extending round the same, but the object of my investigations has been the obtaining of a high grade atomizing of the fuel for which purpose the direction of the fuel channels is of less importance. The high grade atomizing of the fuel which is of great importance for effecting a complete combustion of the same is obtained by a special dimensioning of the intermediate chamber which has been found by a great number of experiments. Thereby it has been found that, in order to obtain a high grade atomizing, the height of the chamber, i. e. the distance between the inner edge of the outlet opening and the opposite wall of the chamber, must be at most equal to or better less than the radius of the outlet opening.

A form of embodiment of the invention is shown on the accompanying drawing, where Fig. 1 is a vertical section through the fuel injector or atomizer and Fig. 2 is a horizontal section along the line A—B in Fig. 1. The atomizer is shown on an enlarged scale.

According to the drawing the atomizer consists of a body 1 and the fuel valve 3 which regulates the flow of fuel to the fuel channels 6. Three channels are shown on the drawing but the number of the same may be varied. The channels 6 lie in radial planes and open at the periphery of the intermediate chamber 5 provided with an outlet opening 4 and are according to the drawing located so as to form an angle with the bottom of the chamber 5. It is as mentioned above of great importance for obtaining a high grade atomizing of the fuel that the heighth of the chamber 5 at the opening 4 is dimensioned in a special manner, viz, so that the distance from the inner edge of the opening 4 to the upper wall of the chamber 5 is at most equal to or preferably smaller than the radius of the opening 4. As the opening 4 in smaller engines up to 25 horse power has a very small radius, about 0,3 m. m. the height of the intermediate chamber will consequently be very small. I am of opinion that the reason why the fuel becomes atomized in a high degree is this that the fuel is from all directions forced to the opening 4, so that partly by the shock of the fuel particles against one another and partly by the sudden change of their direction of movement at the opening 4 the fuel is atomized so as to form a very fine spray.

The bottom of the chamber 5 consists according to the drawing of a disc 2 of a very hard material, such as tempered steel or a hard mineral, which is held in position by means of a nut 7. The outlet opening 4 is provided in said disc.

Further in connection with Fig. 1 it is to be noted that the reduced inner end of the body 1 is tightly fitted in the shoulder opening of one of the cylinders of the engine, the extreme inner end of the body being threaded for the reception of the threaded portion of the nut 7, the latter being recessed on its inner surface for embracing the disc 2. The wall of the chamber 5 opposite the wall formed by the plate 2 preferably consists of

the provision of an angular recess provided on the inner edge of the body 1. The outer edge or surface of the nut is substantially flush with the inner surface of the cylinder end.

The high grade atomizing of the fuel flowing out from the opening 4 is in engines of the character in question important even from that point of view that the starting of the same is thereby considerably facilitated. By constructing the fuel atomizer according to my present invention the further advantage is gained that the wearing of the outlet opening will be considerably lower than in previous constructions and will take place uniformly round the opening. Finally the risk of the opening being stopped up will be considerably reduced, since, even if a solid particle would fasten in the intermediate chamber the function of the atomizer would not be interrupted.

It is evident that the invention is not limited to the form of embodiment shown but the constructional details may be varied within the scope of the invention.

I claim:

1. Fuel atomizer for internal combustion engines of the solid injection type comprising a body having a flat end, a circular recess provided in the said flat end and having a flat bottom surface, a disc-like plate apertured to provide a fuel discharge and constituting with the said bottom surface a chamber of extremely small depth, means fixing the said plate to the said body, a fuel valve arranged centrally and longitudinally of the said body, and supply channels for the fuel lying in radial planes and leading from the longitudinal axis of the fuel controlling valve and opening adjacent the periphery of the said chamber and forming angles with the walls of the chamber.

2. Fuel atomizer for internal combustion engines of the solid injection type comprising a body having a flat end, a disc-like plate apertured to provide a fuel discharge, means holding the said plate at a slight distance from the end of the body, said plate constituting with the end of the body a chamber of extremely small depth, means fixing the said plate to the said body, a fuel controlling valve arranged centrally and longitudinally of the said body, and supply channels for the fuel leading from the said valve and opening adjacent the periphery of the said chamber and forming angles with the walls of the chamber, said channels lying in radial planes.

In testimony whereof I have signed my name to this specification.

AXEL UNO STURE DANIELSSON.