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FUEL FEEDING DEVICE FOR COMBUSTION ENGINES

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Fig. 1

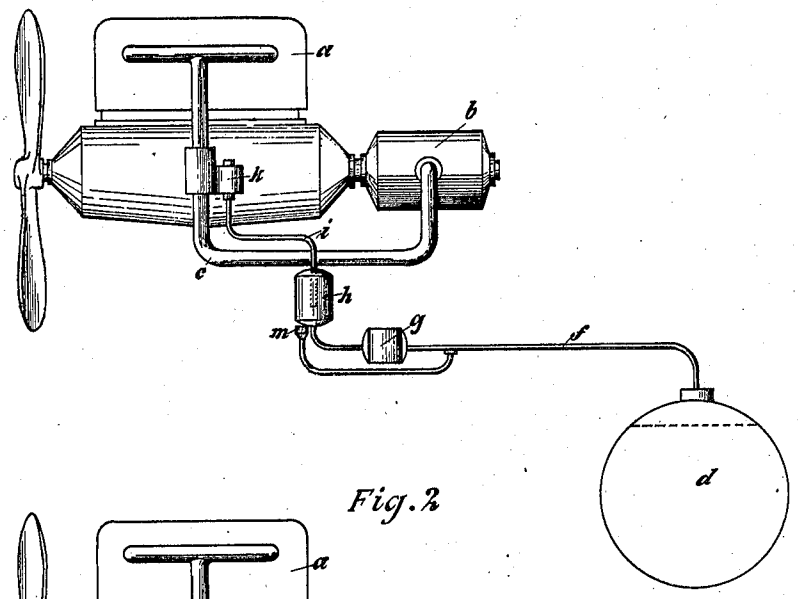
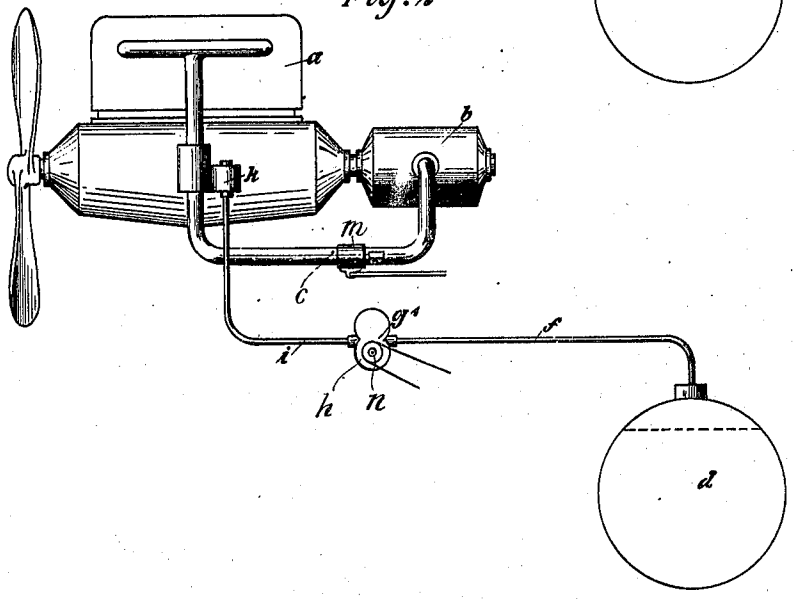


Fig. 2



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FUEL-FEEDING DEVICE FOR COMBUSTION ENGINES.

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In combustion engines, in which the fuel is conducted from the fuel tank into the carburetter, connected to the suction pipe, by means of the sucking effect of the operating piston, it is necessary for the purpose of ensuring the regular feed of fuel, to put the latter within the tank under a certain pressure. Of course, it is advantageous to hold said pressure in the fuel tank as low as possible, as the thickness of the walls of said fuel tank must be selected in proportion to the pressure and it is, of course, desirable to make said walls as thin as possible for the purpose of obtaining a far reaching reduction of weight. This feature is mainly important for the motors of aeroplanes, especially as the construction of the fuel tanks therefor is dependent on the available space.

The invention relates to a device for conducting the fuel to the suction pipe of combustion engines, to which the combustion air is temporarily supplied by a compressor or its equivalent under a pressure, which exceeds the pressure of the surrounding air.

This feature is to be mainly considered for the motors of aeroplanes, as such motors must be adapted to operate in various altitudes. Usually to such motors the combustion air is suitably supplied by means of a compressor for the purpose of obviating the loss of efficiency, due to the decreasing density of the air at increasing height of ascension. Such an artificial air supply can also be employed for the purpose of conferring temporarily to the motor an efficiency, which exceeds the normal efficiency (without employing a compressor) at the operation under normal pressure. If in this manner an increase of the efficiency of the motor is obtained, a higher pressure is produced under these conditions by the compressor in the suction pipe of the motor and this higher pressure must be overcome by the pressure of the supplied fuel, so that the latter can be introduced into the air current. To render this procedure possible, it is, of course, necessary to make the pressure within the fuel tank comparatively high, if the previously employed method of feeding the fuel by means of said pressure is to be maintained.

The device forming the subject matter of the present invention now makes it possible to dispense with such a high pressure in the fuel tank.

For this purpose the fuel is fed into the carbureter at normal operation, that is to say, when the motor operates without the compressor, by means of the usual feed pressure prevailing in the fuel tank, when, however, the compressor is employed for supplying the combustion air, the fuel, after leaving the fuel tank, is put under a corresponding higher pressure, so that said fuel can overcome in the suction pipe the pressure of the air current streaming in by the compressor, without however, exposing the fuel tank to the increased fuel pressure. This is done by a pump interposed in the fuel pipe between the fuel tank and a carburetter.

This is effected by means of a rotary pump, preferably a geared rotary pump, and there is, according to this invention, intentionally some play left between the co-operating inner pumping members, i. e. the rotary piston or pistons or cogged pistons or the like, the other parts of the pump being rendered tight by packings in the usual manner. Owing to the provision of that play a certain maximum consumption of fuel is not surpassed. The fuel passes through the thus altered pump also if this latter is at a standstill, the fuel being then fed merely under the pressure existing in the fuel tank.

In order to make my invention more clear, I refer to the accompanying drawing, in which several forms of construction of it are illustrated by way of example, and in which Figs. 1 and 2 are diagrammatical representations of the combination and arrangement of parts forming the invention, the form illustrated in Fig. 1 showing the employment of a piston pump and that shown in Fig. 2 illustrating the use of a rotary geared pump.

Referring to the drawings *b* is the compressor of or for the motor *a* and delivers the combustion air into the suction pipe *c*. *d* is the fuel tank, in which the fuel is put under pressure by any suitable manually or mechanically operated means. The fuel passes from the tank *d* through the pipe *f* to a pump, which may be either a piston pump

g as shown in Fig. 1, or a rotary pump g' as shown in Fig. 2; from the pump the fuel passes through the pipe i into the float space k of the carbureter and through the nozzle thereof into the mixing space of said carbureter.

The carbureter or specifically the mixing space thereof is connected with the pressure pipe c of the compressor b, as well as with the suction pipe of the motor a.

Referring now to Fig. 2, the pipe c is provided with a cutout m of any suitable construction, and the geared rotary pump g' is driven independently of the engine by any suitable driving means n, and has a certain play between the teeth of its rotary members, and a certain play is left between said rotary members and the outer portions of the circumferential wall of the pump casing. Owing to the provision of these two plays the pressure which the pump g' is able to produce in the pressure pipe i cannot surpass a certain height, and if the pump is at a standstill fuel can pass through it because of the existence of the two plays in question.

Having thus particularly described the invention what is claimed as new is:

1. A fuel feeding device for combustion engines, comprising in combination, a carbureter arranged to normally operate in combination with a supply of air at a predetermined normal pressure, a fuel tank, a pipe connection between said tank and carbureter whereby fuel is supplied to the latter for admixture with the air at said predetermined normal pressure, means communicating with said carbureter whereby the pressure of the aforesaid air supply is increased beyond said predetermined normal pressure, means provided in said pipe connection for increasing the pressure of the fuel supplied to the carbureter, in a manner to overcome the resistance interposed by the increased air pressure to the entry of said fuel into said carbureter, and a conduit leading from the carbureter to the engine whereby a mixture of air and fuel either at normal pressure or at an increased pressure is delivered to the engine.

2. A fuel feeding device for combustion engines, comprising in combination, a carbureter arranged to normally operate in combination with a supply of air at a predetermined normal pressure, a fuel tank, a pipe connection between said tank and carbureter whereby fuel is supplied to the latter for admixture with the air at said predetermined normal pressure, means whereby the pressure of the aforesaid air supply is increased beyond said predetermined normal pressure, a geared rotary pump in said pipe connection for increasing the pressure of the fuel supplied to the carbureter, in a manner to overcome the resistance interposed by the increased air pressure to the entry of said fuel into the carbureter, said pump having a play between the teeth of its rotary pumping members sufficient to permit the normal flow of fuel to the carbureter and to prevent surpassing of a predetermined increased pressure in said fuel pipe, and a conduit leading from the carbureter to the engine whereby a mixture of air and fuel either at normal pressure or at an increased pressure is delivered to the engine.

3. A fuel feeding device for combustion engines, comprising in combination a fuel tank, a carbureter, a pipe connection between said fuel tank and carbureter for delivering fuel to the latter, means operated at will for supplying combustion air to the carbureter under increased pressure, and a pump in said pipe connection operated independently of the engine to increase the pressure of the fuel after it leaves the fuel tank, in accordance with the increased air pressure whereby resistance to the entry of said fuel into the carbureter when increased air pressure exists therein is overcome, said pump when at rest permitting the passage of fuel to the carbureter when normal air pressure exists therein.

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