The new method for arrangement of working process in the internal combustion engine (IC engine) and principally new IC engine

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Proposed is the principally new IC engine in which the working process is arranged in such a way that in any conditions the complete combustion of fuel is secured.

The major disadvantage of the modern IC engine is that due to very short time of working processes the fuel mix does not have enough time to burn out completely and so exhaust fumes would at all times contain a toxic carbon oxide and a whole bunch of harmful unburnt hydrocarbons. This makes it imperative that all modern car engines should be fitted with expensive catalytic reactors (afterburners) of exhaust fumes.

We propose to make use of a new method for arrangement of the working process in the IC engine in accordance with which a complete combustion of fuel is achieved through increase of time of its presence in the combustion chamber.

Besides the ignition process in the proposed engine is initiated not by weak spark but a powerful flame, i.e. such carburetor engine features the self-ignition property which allows expansion of the range of use of a variety of fuels. Thus, the proposed arrangement of the working process of the IC engine based on ignition of fuel mix by the powerful flame and increase in combustion time always makes the fuel mix burn completely and this, in turn, excludes the presence of the toxic unburnt components in exhaust fumes. That is why the car fitted with the proposed engine is extremely environment friendly and does not need catalytic reactors (afterburners) of exhaust fumes - everything burns inside the cylinders, which in turn sharply improves the fuel efficiency. Besides such IC engine becomes of multi-fuel type, i.e. without conversion it is capable of operating on very different fuels and their mixes, for example, gasoline of any grade, kerosene, natural gas (methane). In such situation the octane number become immaterial and critical notion is only the caloric value of fuel which predetermines all characteristics.

Moreover, it becomes possible to arrange the two-stroke process in the same way, as a result of which is also becomes environment friendly. This is a rather attractive proposal, since it is well known that two-stroke IC engines feature the highest power-to-volume ratio and their use allows sharp reduction in

dimensions and weight, hence, reduction in cost (as contrasted to the four-stroke engines).

At present the two-stroke engines failed to find wide application exactly because of low degree of fuel combustion. This proposal will allow this disadvantage to be substantially mitigated.

The proposed engine (two-stroke or four-stroke) is ideally suitable for operation on natural gas, including liquefied methane, while all known gas-operated engines are adapted to methanes, and hence have unsatisfactory characteristics.

Field of application

Transport and stationary prime movers:

- cars;
- tractors;
- motorbikes;
- locomotives;
- ship engines;
- power generating plants;
- etc.

Major parameters and characteristics

The proposed engine is capable of replacing the classic carburetor (spark ignited) and diesel (compression ignited) engines, while eliminating their major shortcomings and combining their advantages, which cover:

- minimal specific weight;
- improved ecological characteristics (sharp reduction in emission of toxic exhaust fumes);
- improved fuel efficiency, overall efficiency and specific horsepower rating;
- simple design;
- relative simplicity of embodiment - all know-how is concentrated in the cylinder head. So actually any classic IC engine can be improved.

Description of existing analogs

All known analogs have inferior set of characteristics as contracted to the proposed design.