<u>Cycle of Sevtsov</u>

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The idea is to increase fuel economy of two-stroke diesel engines with any gas exchange scheme, transferring them to a new work cycle.

From the thermodynamics course based on the heat supply process, three cycles of internal combustion engines are known:

1. A constant-pressure heat supply cycle is a diesel cycle.

The first diesel engines worked in this cycle with fuel supply from the external high pressure compressor. Due to the high energy consumption of the compressor drive, these engines are not currently being built.

2. A cycle with a mixed heat supply to a compression-ignition motor - namely, with a constant volume and constant pressure - the so-called G. Trinkler cycle. All modern four-stroke and two-stroke diesel engines work in this cycle.

3. A cycle with a constant volume heat supply, but only for engines with forced ignition is Otto's cycle. For example, all modern carburettor engines work on this cycle.

According to thermodynamics, it is also known that the most economical cycle for internal combustion engines is the supply of heat with a constant volume.

However, the efficiency of the Otto cycle is limited by the relatively small degree of compression of the working mixture due to possible detonation.

It would be logical to offer the operation of diesel engines, where the compression ratio is limited only by the strength of the parts, and the heat is supplied only at a constant volume. Unfortunately, it is impossible to ignite the mixture instantly on any diesel engine when the piston is in the PMT of the "classic" crank mechanism, as in Otto gasoline engines. Diesel engines require time for fuel injection, mixing it with the heated air in the combustion chamber and ignition from contact with this air. Consequently, part of the fuel in the "classic" diesel engine burns out when the piston moves to bottom dead center - at constant pressure, which, as you know, is a thermodynamically inefficient process.

It can be assumed that the situation can be corrected if we ensure that the piston in its upper dead center is stationary rather than stopped as in a diesel engine, replacing the crank mechanism with another mechanism.

These can be mechanisms to change the degree of compression on the move Otto's engines or the "half" of the rhombic mechanism to ensure that the piston stops and stays like in the Stirling´s engine. An analysis of the ideas of these mechanisms, known to the author, shows that they have the following irreparable fundamental drawback: an increase in gas pressure and mechanical forces with a piston standing in these mechanisms requires an increase in the kinetic energy of the engine flywheel that to hold the standing piston.

There is a technical contradiction - the piston must stop and stand during the combustion of fuel to increase efficiency, but with the existing crank mechanism such retention of the piston will require additional kinetic energy of the engine flywheel.

I see the solution of this technical contradiction in the new working cycle of two-stroke diesel engines.

Fig. 1 shows the following positions of the mechanism for the new cycle:

1.piston;
2. compression rings;
3. oil rings;

4. uncovered spring steel trapeze;
5. oil supply channel (for cooling the piston 1);
6. connecting rod;
7. cold-forged rivets.

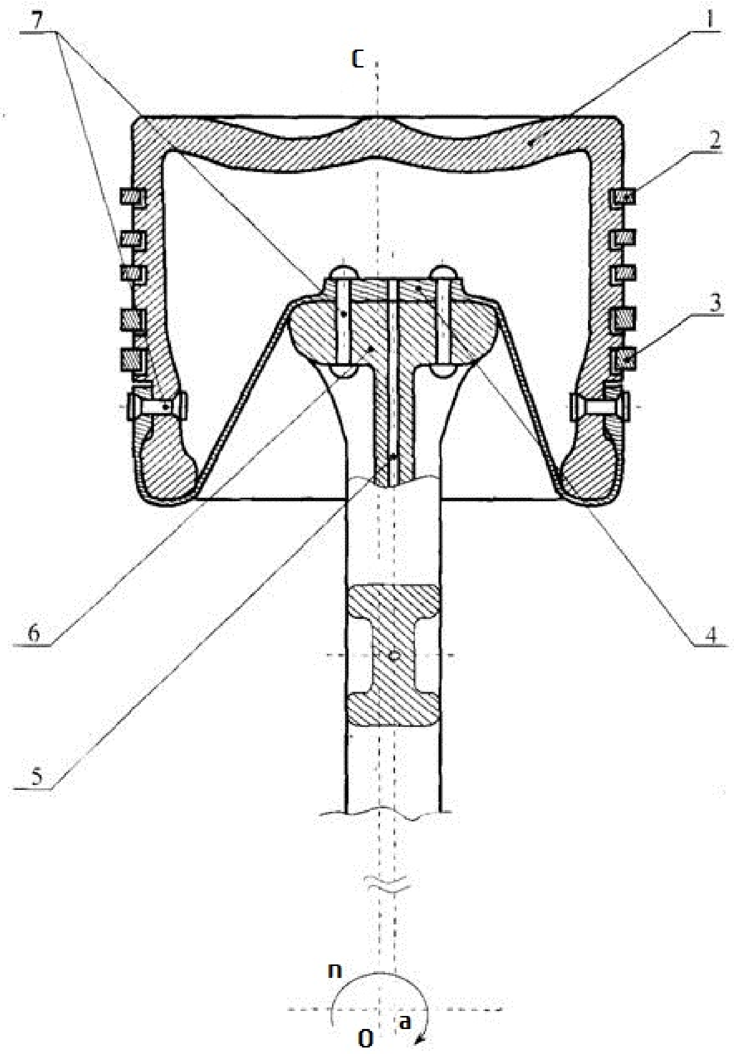

Fig.1 – Mechanism for a new cycle

The "O" point corresponds to the center of rotation of the engine crankshaft.

The "OC" axis is the vertical axis of the engine slave cylinder.

The distance between the crankshaft axis of rotation and the connecting rod axis 6 when piston 1 is at the upper dead center (distance "O-a") is the desekzage of the crank mechanism.
The arrow - n indicates the direction of rotation of the crankshaft.
The principle of realization of a new working cycle of the two-stroke diesel engine is clear from the given scheme.
So, for example, it is clear that when the crankshaft rotates, the connecting rod will be wound on the profile of the T-head on one or other branches of the elastic trapeze. In this case, the desekzage of the motor will change - that is, the pole of the connecting rod, in addition to the usual movements along the working cylinder, will able yet to move and across a cylinder. Transfer of a pole of a rod from one party of a wall of the working cylinder on another and on the contrary will lead to that the piston appears to be stopped and standing in both dead points.

Staying at the top dead center will allow you to move away from the G.Trinkler cycle and set fuel-saving heat supply - with constant volume of the combustion chamber.
According to the scheme it is visible that there will be observation of piston stagnation in the lower dead point as well.

This circumstance will allow to level lack of two-stroke diesel engines - short time for cleaning and blowing of the working cylinder.

From the scheme it is visible that gas pressure of the piston operates on two branches of a trapeze. But since the left branch of the trapeze is more steep than the right, the vertical force of gas pressure will seek to turn the crank arm towards the rotation of the crankshaft through the more loaded left shoulder of the T-head of the connecting rod.

The technical contradiction has been eliminated - with the growth of pressure in the upper dead point, this growth tends to push through the connecting rod itself through the upper dead center.

In principle, it would be possible to fix the trapeze with rivets from the inside in the piston, but extra girths are provided for friction forces unloading the rivets.

An analogue is the retention of ships at the marina by canals entwined on berth stands.

A patent was received for the idea - UA89380C2 dated 12.03.2007 y.
http://uapatents.com/6-89380-robochijj-cikl-i-dvotaktnijj-tronkovijj-dizel-dlya-jjogo-zdijjsnennya-cikl-sehvcova.html
- see Fig. 2

Fig.2 –PATENT UA 89380 C2 dated 12.03.2007 y.