

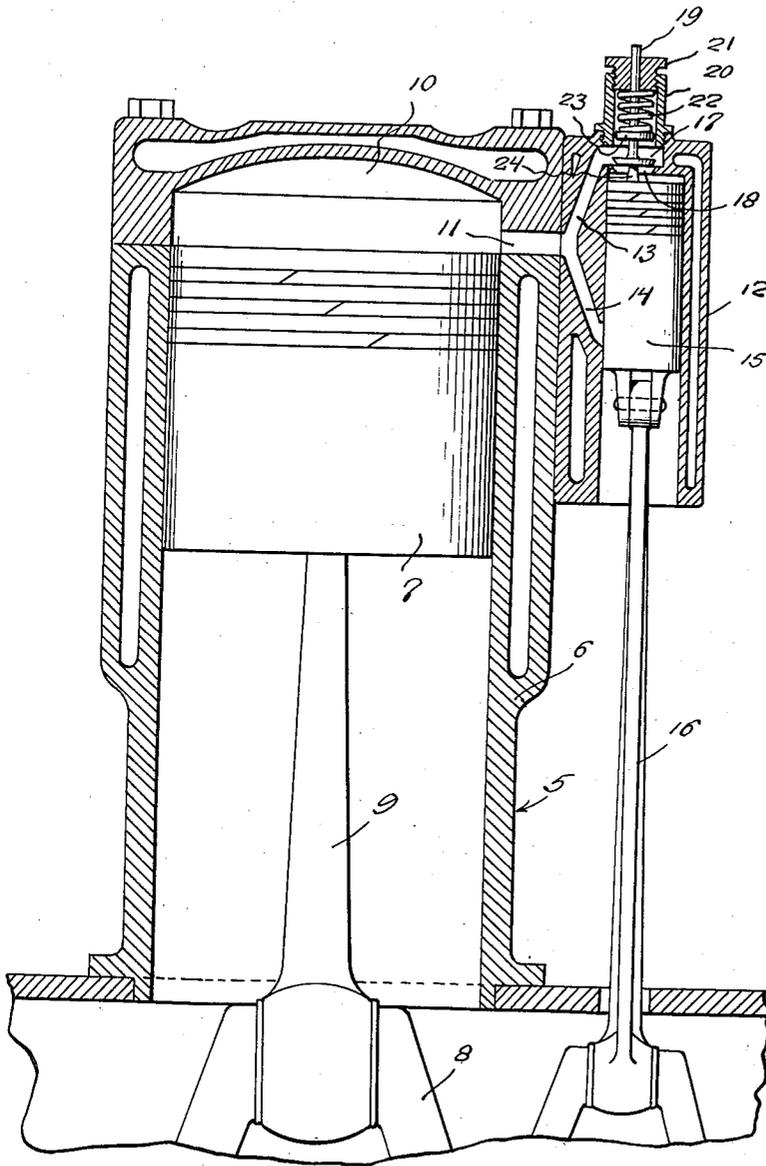
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1 Claim. (Cl. 123—143)

This invention relates to fuel ignition for internal combustion engines operating on the Diesel principle. Pistons of engine operating on this principle are subjected to high temperatures, due to the high compression of the fuel necessary for the ignition thereof, which unduly shortens the life of said pistons. It is, therefore, the primary object of this invention to prolong the life of the pistons by removing therefrom the duty of highly compressing the fuel to bring about the ignition thereof, by providing a fuel compressing means for igniting the fuel which ignites the fuel compressed by the pistons at a much lower compression ratio than heretofore.

With these and other objects in view as will be hereinafter more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts as will be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawing, in which

The figure is a fragmentary vertical sectional view showing a portion of an engine operating on the Diesel principle equipped with a fuel igniting means constructed in accordance with the present invention.

Referring in detail to the drawing, the numeral 5 indicates a fragmentary portion of an internal combustion engine operating on the Diesel principle. The means for admitting the fuel and the exhausting thereof from the engine is not shown as any of the standard types of fuel injection and exhaust means may be employed.

The main cylinder of the engine is indicated by the character 6 and reciprocally mounted therein is a main piston 7 connected to the crank shaft 8 by a connecting rod 9. The firing chamber of the cylinder is designated by the character 10. A port 11 is provided in the cylinder 6 extending from the exterior thereof to the firing chamber. This port 11 is provided for the purpose of adapting the present invention to the engine.

An auxiliary cylinder 12 is mounted on the cylinder 6 in any suitable manner and is provided with connected fuel passages 13 and 14 which connect with the port 11 of the engine 5. An auxiliary piston 15 is slidable in the cylinder 12 and is connected to the crank shaft 8 by a connecting rod 16. The auxiliary piston 15 travels in unison with the piston 7 of the engine. The auxiliary cylinder 12 has a chamber 17 formed in its upper end connecting with the cylinder

12 directly above the piston by a port 18 in the form of a valve seat. The chamber 17 is in direct communication with the fuel passage 13.

A spring operated valve 19 controls the port 18. A housing 20 is mounted on the auxiliary cylinder and slidably supports the valve 19 by being provided with an apertured plug 21 threaded in the housing and providing a seat for a coil spring 22 bearing against the collar 23 on the stem of the piston. The spring 22 acts to hold the valve against any compression within the cylinder 12 created by the piston 15. A lug 24 is formed on the upper end of the piston 15 so that when the piston nears its uppermost position, the lug 24 engages the valve and unseats the latter to open the port 18. The passage 14 connects with the cylinder 12 and is normally closed thereto by the piston 15, that is, when the piston is in positions other than its lowermost position in the cylinder 12. When the piston 15 is in its lowermost position in the cylinder 12, the fuel passage 14 is uncovered and thereby placed in direct communication with the cylinder 12.

In operation, during the fuel intake stroke of the piston 7 and when said piston 7 reaches a position near to its lowermost position, the piston 15 uncovers the fuel passage 14 permitting the fuel in the firing chamber 10 to enter the auxiliary cylinder. On the compression stroke of the piston 7 and the piston 15, the fuel in the auxiliary cylinder is highly compressed to bring about spontaneous combustion thereof. As the piston 15 nears its uppermost position, it opens the valve 19 allowing the ignited fuel in the cylinder 12 to pass into the chamber 17 through the passage 13 into the firing chamber 10 and ignite the fuel therein for action on the piston 7 during the latter's working stroke. Thus it will be seen that the piston 7 is relieved of the duty of highly compressing the fuel in order to bring about spontaneous combustion thereof and consequently the compression ratio within the cylinder of the engine 5 may be lowered over that required in the conventional type of Diesel engine and thus relieve the piston 7 of the excessive heat which the pistons of Diesel engines are subjected to, consequently materially prolonging the life of the piston of the engine.

This invention has been described in connection with an engine operating on the Diesel principle. However, an engine designed for electric ignition may have the present invention adapted thereto for the ignition of the fuel.

While I have shown and described the pre-

ferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention as claimed.

Having thus described my invention, what I claim is:

In a Diesel type internal combustion engine, a main cylinder having a firing chamber and port connecting therewith and leading exteriorly of said cylinder, a main piston in said cylinder, a crank shaft connected to said piston, an auxiliary cylinder mounted on the main cylinder and having connected fuel passages communicating with said port, said auxiliary cylinder having a chamber in direct communication with one of the

fuel passages and the other fuel passage having direct communication with the auxiliary cylinder, a valve mechanism for opening and closing said last-named chamber to said auxiliary cylinder, an auxiliary piston in the auxiliary cylinder and connected to the crank shaft for movement in unison with the main piston to control fuel from the firing chamber of the main cylinder into the auxiliary cylinder and for compressing and igniting the fuel in the auxiliary cylinder, and a lug on the auxiliary piston to unseat the valve to allow the ignited fuel to enter the second-named chamber and pass into the firing chamber by way of one of the passages and said port on the power stroke of the main piston.

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