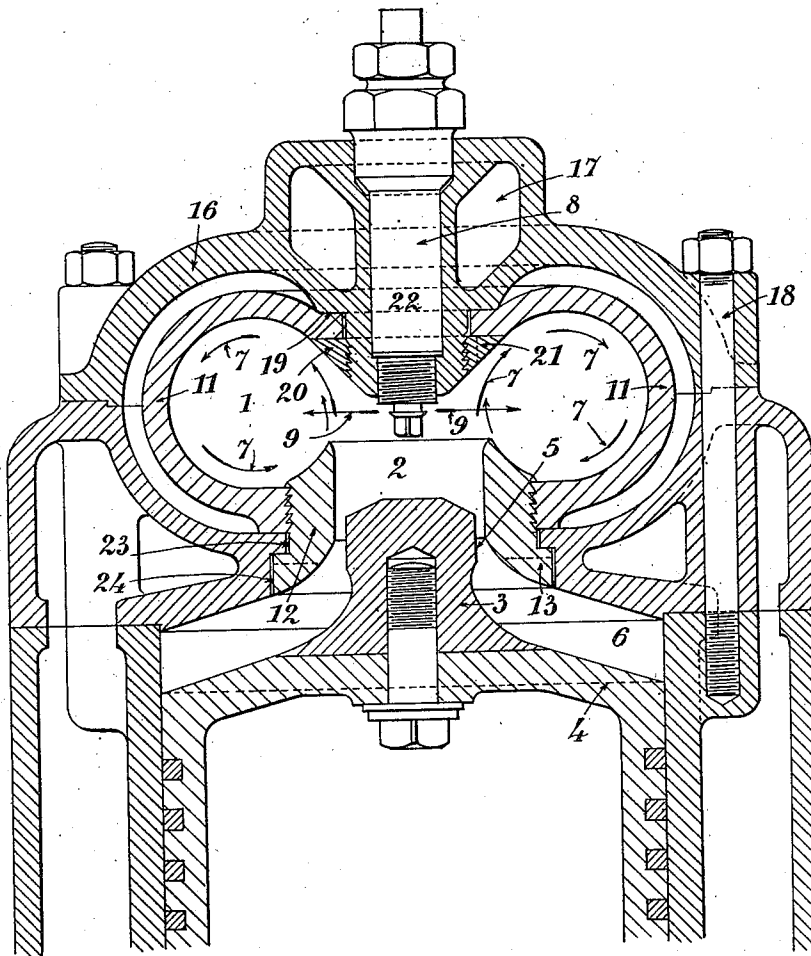


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 COMBUSTION CHAMBER FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED JULY 14, 1921.

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COMBUSTION CHAMBER FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, EUGÈNE HENRI TARTRAIS, citizen of the French Republic, residing at Maisons-Laffitte, Seine-et-Oise, in the Republic of France, have invented new and useful Improvements in Combustion Chambers for Internal-Combustion Engines, of which the following is a specification.

This invention relates to an improved combustion chamber for internal combustion engines with heated cylinder head and injection of liquid fuel.

The accompanying drawings show by way of example a sectional view of the upper part of the cylinder and piston of a two-cycle engine provided with a combustion chamber according to the invention. The piston is herein represented somewhat before the dead point.

As shown in the drawing, the engine comprises a combustion chamber 1 having substantially the shape of a torus and connected with the cylinder by a narrow passage 2 into which the extension 3 of the piston 4 engages at the end of the piston stroke, leaving the annular space 5. Through this latter space is discharged the air which has been temporarily enclosed at the end of the compression stroke in the chamber 6 formed between the end of the cylinder and the end of the piston. This air enters the chamber 1 and assumes a whirling motion as shown by the arrows while at the same time the atomizer 8 delivers the liquid fuel according to the arrows 9 which becomes mixed with the air in movement. The ignition may be obtained when starting the engine by an incandescent ignition plug or by other desired means. When operating at normal speed the ignition is automatic, being obtained by the heat of compression and the heat of the walls.

This invention is essentially characterized by the construction of the combustion chamber. The member 11 constituting the chamber properly so-called, which is made of a metal or alloy which is only slightly oxidizable and has a considerable mechanical strength when hot, is formed separately and secured to the cylinder by means of the member 12 which forms the passage 2 and is made of the same alloy or like material. The said member is screwed by means of peripheral teeth or projections such as 13 by operating through the cylinder, in case the cylinder head is not secured separately as shown in

the drawing. The screwthread is preferably trapezoidal or rectangular in order to obviate any unscrewing by reason of unequal expansion. About the combustion chamber 60 is a casing 16 of very strong construction which is secured in a substantial manner to the cylinder by the stud-bolts 18 which in this example are likewise used to secure the cylinder head.

The central portion of the said casing 16 comprises a shoulder 19, whereupon a correspondingly dressed part of the member 11 constituting the combustion chamber is caused to bear by means of a nut 20 having preferably a trapezoidal thread and provided with the peripheral teeth 21. The casing 16 is provided with a water circulation 17 and has disposed therein the atomizer 8. The said casing is preferably constructed of a heat-conducting metal such as bronze whereby the proper cooling of the atomizer is effected.

These various members are assembled in the following manner: The chamber 11 is secured in the first place to the outer casing 16 by the nut 20 which has the proper size to enable it to be introduced through the aperture in the bottom of the chamber 11. During this operation, the said chamber is disposed in the suitable angular position in order that the ignition plug shall occupy a proper position such a plug is to be used. The construction of the members may be so carried out as to leave a radial play at 22 between the combustion chamber 11 and surrounding casing 16 to provide for any permanent changes in the shape of the member 11 under the action of successive heating and cooling. The members thus assembled are then disposed upon the cylinder head, or directly upon the cylinder according to the case, and the said chamber is secured by means of the screwthreaded member 12 which is fitted in place with a considerable amount of play at 23 and 24 in order to provide for the free expansion of the said member at high temperatures.

The said assemblage is highly advantageous inasmuch as provision is made for all necessary expansion effects of the said chamber, that is, in the portions wherein the joints occur, by a sliding movement upon bearing portions which are previously ground and polished, and in the portions having the form of a torus by the relative flexibility afforded by the shape itself and by

the use of thin walls such as is rendered possible by the double support provided for the combustion chamber. The use of thin walls will likewise confer an advantage in that it provides for a very rapid heating upon starting the engine, and furthermore it affords a saving of expensive material.

To recapitulate, there is no rigid connection between the hot and the cold portions, and the combustion chamber 11 is not subject to the drawback of being highly heated in one part and very cold in another, such as would certainly be a source of permanent changes of shape after each cycle of heating and subsequent cooling, such changes of shape being indefinitely increased in the same direction.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An internal combustion engine working with an injection of liquid fuel, comprising a cylinder, a separate combustion chamber having the shape of a torus, which communicates with the cylinder by a central opening into which a projection on the piston is adapted to engage, and an annular screwthreaded plug screwed into said opening in the combustion chamber, an amount of play being left laterally between the said plug and the adjoining part of the cylinder.

2. An internal combustion engine working with an injection of liquid fuel, comprising a cylinder, a separate combustion chamber having the shape of a torus, which communicates with the cylinder by a central opening into which a projection on the piston is adapted to engage, an annular screwthreaded plug screwed into said opening in the combustion chamber, a casing surrounding the combustion chamber and spaced therefrom, in its lateral part, means for securing said casing to the cylinder and a fuel atomizer mounted on said casing and extending into the combustion chamber.

3. An internal combustion engine working with an injection of liquid fuel, comprising a cylinder, a separate combustion chamber having the shape of a torus, which communicates with the cylinder by a central opening into which a projection on the piston is adapted to engage, an annular

screwthreaded plug screwed into said opening in the combustion chamber a casing surrounding the combustion chamber and spaced therefrom in its lateral part, said casing having a water cooled part, means for securing said casing to the cylinder and a fuel atomizer mounted on the water cooled part of said casing and extending into the combustion chamber.

4. An internal combustion engine working with an injection of liquid fuel, comprising a cylinder body, a cylinder head having a cup shaped recess in its upper face, a separate combustion chamber having the shape of a torus, which communicates with the cylinder by a central opening into which a projection on the piston is adapted to engage, an annular screwthreaded plug screwed into said opening in the combustion chamber, the latter being spaced apart laterally from the inner wall of the cup shaped recess, a casing or cover having the shape of an inverted cup, surrounding the upper part of the combustion chamber and laterally spaced apart therefrom, means for securing the casing and cylinder head to the cylinder body and a fuel atomizer mounted on said casing and extending into the combustion chamber.

5. An internal combustion engine working with an injection of liquid fuel, comprising a cylinder, a separate combustion chamber having the shape of a torus, which communicates with the cylinder by a central opening into which a projection on the piston is adapted to engage, an annular screwthreaded plug screwed into said opening in the combustion chamber a casing surrounding the combustion chamber and spaced therefrom in its lateral part, said casing having a central portion which extends through the wall of the combustion chamber, means for securing said casing to the cylinder, a fuel atomizer extending through said central portion of the casing and projecting into the combustion chamber and a nut screwed upon said central portion of the casing and bearing upon the wall of the combustion chamber.

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

EUGÈNE HENRI TARTRAIS.