W. O. PLATT AND J. REID.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED FEB. 12, 1919.

1,341,478. **Patented May 25, 1920.**

Fig. 2.

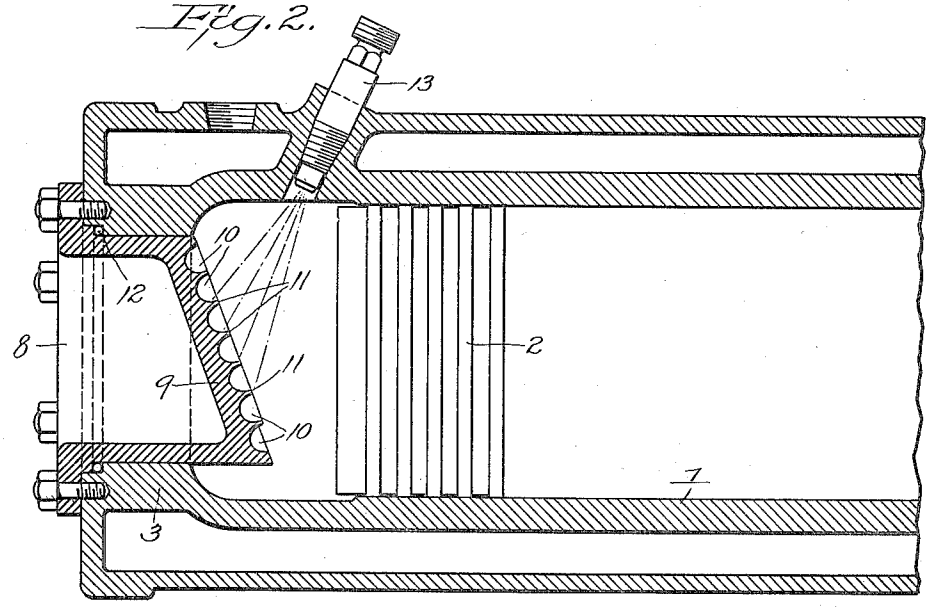


Fig. 3.

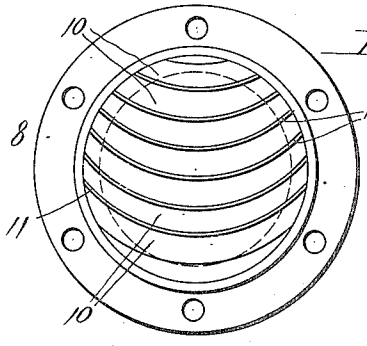


Fig. 4.

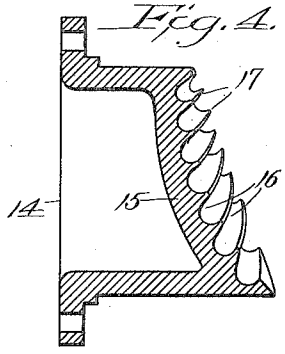
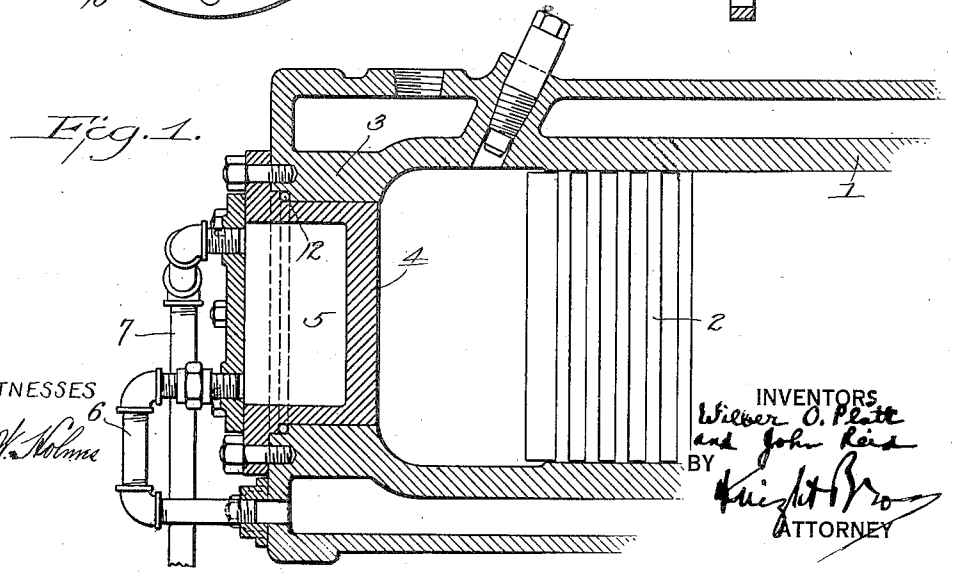


Fig. 1.



WITNESSES

O. K. Holmes

INVENTORS

Wilbur O. Platt

and John Reid

BY

ATTORNEY

UNITED STATES PATENT OFFICE.

WILBER O. PLATT AND JOHN REID, OF OIL CITY, PENNSYLVANIA, ASSIGNORS TO JOSEPH REID GAS ENGINE COMPANY, OF OIL CITY, PENNSYLVANIA, A JOINT-STOCK COMPANY.

INTERNAL-COMBUSTION ENGINE.

1,341,478. Specification of Letters Patent. Patented May 25, 1920.

Application filed February 12, 1919. Serial No. 276,597.

To all whom it may concern:

Be it known that we, WILBER O. PLATT and JOHN REID, citizens of the United States, both residing at Oil City, county of Venango, State of Pennsylvania, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates more especially to those types of internal combustion engines in which fluid fuels are vaporized within the cylinder. The primary object of our invention is to provide improved means for vaporizing fluid fuels without breaking down the structure of such fuels as oils and the like. Toward the attainment of this object, our invention contemplates suitable means for distributing such a fuel evenly over a centrally disposed surface and thus improving the conditions under which it is vaporized. Another object of the invention is to increase the durability of the cylinder parts by equalizing the temperatures in the zone of vaporization which produces a more uniform explosion and less deteriorating effects at particular points. Other objects of invention will appear in the specification, reference being had to the drawings in which:

Figure 1 is an axial section of a gas and oil engine showing the cylinder provided with a head adapting it to be operated as a gas engine,

Fig. 2 is a similar section of the engine with the oil vaporizing head in position;

Fig. 3 is an inside elevation of the fluid vaporizing head;

Fig. 4 is a section of a modified construction of cylinder head which is more especially adapted for engine cylinders of large diameter.

On the drawings, our invention is shown in an adaptation to a gas and oil engine in which the cylinder 1 is arranged with its axis horizontal and within which reciprocates a piston 2. At one end, said cylinder is provided with a frame or socket 3 which is adapted to receive a cylinder head 4 (see Fig. 1) which is provided with a plain flat inwardly presented wall and a chamber 5 for cooling fluid which passes through pipes 6 and 7 or a cylinder head 8 (see Fig. 2) which is provided with an inclined wall 9. The inwardly presented face of the wall 9 is broken by a series of arcuately curved grooves or corrugations 10 which are preferably approximately semicircular in cross section. These grooves or corrugations extend from side to side of the cylinder head as shown in Fig. 3 and are bowed downwardly in such a way as to cause the fluid fuel to drain toward a central area adjacent a vertical plane through the axis of the cylinder. There are thus formed a series of ridges 11 of which each projects farther from the wall 9 than the one next above. The crowns or edges of the ridges 11 thus constitute elements in an imaginary surface which is inclined downwardly toward the piston 2. A packing ring 12 may be interposed between the cylinder socket 3 and cylinder head 4 or 8. A downwardly presented fluid fuel sprayer or projector 13 is arranged in the upper wall of cylinder 1. According to Fig. 4, a cylinder head 14 for large sized engines, preferably has its inwardly presented wall 15 curved from top to bottom as well as from one side to the other which imparts a downwardly bowed as well as a transversely curved to the grooves or channels 16 and the ridges 17. The advantages accruing from this invention will be understood from the following: The approximately semicircular corrugations or grooves impart a cross section to the ridges such that the mass of metal increases from the crowns or edges of said ridges toward the main body portion of the head. This provides an increasing heat conducting capacity as the zones of heat recede from the crowns or edges with the result that there is a relatively rapid reduction of heat on the crowns or edges. Thus while all vaporizing portions of the head are not of the same temperature, the difference of temperature at different points is much less than would be the case with ordinary ribs but greater than it would be in a plain head without ribs or corrugations. As the oil or fuel is projected against the ribs and sides of the corrugations or grooves, it is spread quite evenly over the entire surface of the central zone of the cylinder head and in the best possible condition for vaporization. This result is enhanced by the forward inclination of the inwardly presented wall of the cylinder head. When in operation, the oil or fuel largely reaches the thinnest portions of the ridges, the vaporization being immediate and tending to

cool the crowns or edges so that the temperature is equalized and an even vaporization secured for producing a uniform explosion with a minimum production of free carbon. This action has been found in practice to secure an efficient vaporization without the excessive production of free carbon which results from breaking up the fuel into its constituent elements which usually occurs when it is projected against the overheated ribs. In this connection, it is to be remembered that the complete operations of injection, distribution, vaporization, and explosion, are accomplished in from one fortieth to one fiftieth of a second. It will be readily seen that an improvement in the heat distribution improves the durability as well as efficiency since the rapidly recurring expansion and contraction effects are rendered less violent and thus delays the deteriorating effects on the cylinder head. This construction has been found to be of high efficiency in that the fuel is instantaneously converted into a vapor of uniform structure.

We claim:

1. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with grooves or channels extending inwardly and downwardly with respect to the axis of said cylinder, a piston in said cylinder, and means for delivering fuel into said grooves or channels.

2. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with grooves or channels extending inwardly and downwardly with respect to the axis of said cylinder, a piston in said cylinder, and means for delivering fuel into said grooves or channels, the inner wall of said cylinder head having a general inclination downwardly toward the piston.

3. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with an inwardly presented wall with corrugations extending inwardly and downwardly with respect to the axis of said cylinder, a piston reciprocable in said cylinder, and means for projecting fuel into said corrugations.

4. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with ridges forming grooves or corrugations extending transversely of the inner wall thereof, said ridges being thicker at the base than along their crown edges, a piston reciprocable in said cylinder toward and away from said cylinder head, and means for discharging fuel into said grooves.

5. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with ridges forming grooves or corrugations extending transversely of the inner wall thereof, said ridges being thicker at the base than along their crown edges, a piston reciprocable in said cylinder toward and away from said cylinder head, and means for discharging fuel into said grooves, said ridges extending downwardly and inwardly with respect to a vertical plane through the axis of said cylinder.

6. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with ridges forming grooves or corrugations extending transversely of the inner wall thereof, said ridges being thicker at the base than along their crown edges, a piston reciprocable in said cylinder toward and away from said cylinder head, and means for discharging fuel into said grooves, said ridges extending downwardly and inwardly with respect to a vertical plane through the axis of said cylinder the inwardly projecting crowns of said ridges being arranged in a surface inclined downwardly toward said piston.

7. In an internal combustion engine, the combination with a cylinder having a cylinder head provided with ridges forming grooves or corrugations extending transversely of the inner wall thereof, said ridges being thicker at the base than along their crown edges, a piston reciprocable in said cylinder toward and away from said cylinder head, and means for discharging fuel into said grooves, said ridges extending downwardly and inwardly with respect to a vertical plane through the axis of said cylinder, the inwardly projecting crowns of said ridges being arranged in a surface inclined downwardly toward said piston, the lowermost ridge overhanging the cylindrical wall of said cylinder.

8. In an internal combustion engine, the combination with a horizontal cylinder including a cylinder head, of a piston reciprocable in said cylinder, said cylinder head being provided with grooves or corrugations which form ridges extending from side to side of the cylinder, said ridges from top to bottom protruding progressively farther from said cylinder head, and means for projecting fluid fuel into said grooves or corrugations.

9. In an internal combustion engine, the combination with a horizontal cylinder including a cylinder head, of a piston reciprocable in said cylinder, said cylinder head being provided with grooves or corrugations which form ridges extending from side to side of the cylinder, said ridges from top to bottom protruding progressively farther from said cylinder head, and means for projecting fluid fuel into said grooves or corrugations, said ridges being curved downwardly from either side toward the vertical axial plane of said cylinder.

10. A replaceable head for the cylinders

of internal combustion engines comprising an inner wall inclined to the axis of said head and provided with grooves or corrugations extending from side to side and bowed toward a plane through the axis of said cylinder head.

11. A replaceable head for the cylinders of internal combustion engines comprising an inwardly presented wall with arcuately curved grooves or corrugations extending from side to side to form ridges which project successively farther from said wall from top to bottom of said cylinder head.

WILBER O. PLATT.
JOHN REID.