E. B. BLAKELY.

VALVE FOR OIL ENGINES.

APPLICATION FILED MAY 3, 1918

1,296,614. Patented Mar. 11, 1919.

Fig. 2.

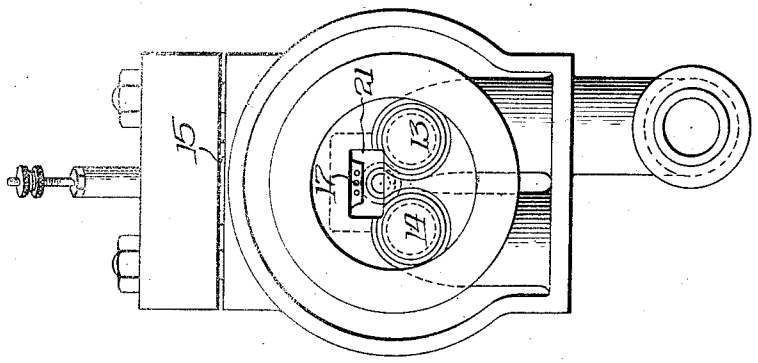


Fig. 3

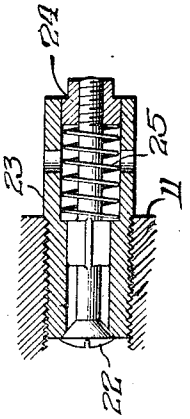
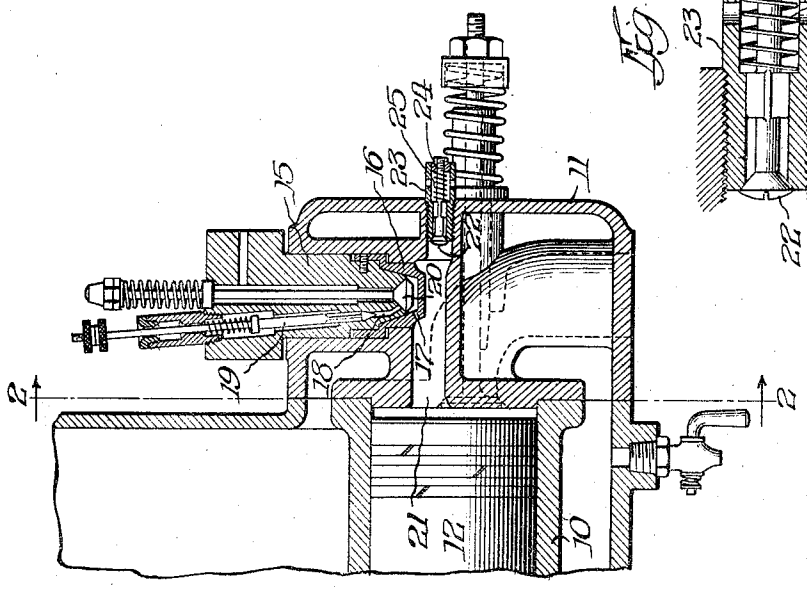


Fig. 1



Witness:
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UNITED STATES PATENT OFFICE.

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VALVE FOR OIL-ENGINES.

1,296,614. Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed May 3, 1918. Serial No. 232,226.

To all whom it may concern:

Be it known that I, EDWARD B. BLAKELY, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves for Oil-Engines, of which the following is a specification.

My invention relates to hydro-carbon engines of the semi-Diesel or Hvid type in which ignition is effected by the heat of compression and liquid fuel is inhaled on the suction stroke.

It has been found in practice that in the construction of certain types of the engine just described, particularly horizontal engines, it is necessary to provide the head of the cylinder with a relatively long passage or space within which combustion takes place and into which the fuel-receiving and igniting cup projects. In view of the fact that this space is in effect a *cul-de-sac* and must be of relatively large size, it is difficult to clear the space of dead gases on the scavenging stroke of the piston.

To this end I have devised a simple expedient for overcoming the objection referred to and enhancing combustion, the result being secured by providing a small air admission valve at the inner end of the passage or space, this valve being adapted to automatically open on the suction stroke and sweep the space with a current of fresh air. The efficiency of an engine of this type depends, of course, on the extent of combustion of the fuel and as combustion is not enhanced by the dead gases which remain in the communicating passage referred to, a certain loss is apparent unless the dead gases can be displaced from the passage. It is true that a certain amount of fresh air is admitted into the cup with the fuel, but the communicating apertures in the cup are small and the pressure, or technically, the reduction of pressure, is not sufficient to admit a sufficient quantity of air into the passage referred to in order to accomplish the desired result. It is also impractical because of lack of space to mount the main intake valve in proper position to sweep the passage with fresh air. I have therefore provided a small valve in such position as to secure the desired result and in practice it is found that a considerable increase in efficiency is secured.

Figure 1 is a vertical sectional view through an engine constructed in accordance with my invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1, and,

Fig. 3 is an enlarged detail view of the valve.

In the drawings it will be seen that the cylinder 10, is provided with a head 11, suitably secured thereto, both the cylinder and head having water circulating passages as usual in such cases. A piston 12, is mounted in the cylinder and performs its usual function. The cylinder head contains the exhaust and main inlet valves 13, 14, which are located at the junction between the head and cylinder and open directly into the compression space at the end of the piston. The ignition means comprises a plug 15, carrying at its lower end a cup 16, having the usual minute escape apertures 17. Fuel is supplied to the passage 18, the same being controlled by the needle valve 19. The fuel and a small quantity of air are admitted simultaneously by the opening of the valve 20, during the suction stroke of the piston. The cup 16, projects into a passage or space 21, which is in effect a *cul-de-sac*. Such a design is necessary in a horizontal engine for several reasons which need not be specifically outlined herein. However, the gases of combustion which do not support further combustion tend to remain in this pocket after the scavenging stroke of the piston and retard combustion during the subsequent cycle. To obviate this I mount at the closed end of the space 21, a valve 22, which is mounted within and has a seat upon a tubular casing 23, adapted to be threaded into the cylinder head. The valve stem is guided at its outer end by a small nut 24, which slides within the bore of the casing 23, a spring 25, which bears on the nut 24, and on a shoulder in the casing, serving normally to retain the valve in closed position. The strength of the spring is such that on the suction stroke of the piston the valve will be opened somewhat and a small quantity of air admitted which serves to displace the dead gases in the passage 21, and replace the same by fresh air which will support combustion.

The exact form and arrangement of the valve and its location with respect to the passage are unimportant and I do not wish to be limited except as indicated in the appended claims.

I claim:

1. In an oil burning engine, the combination with the cylinder and piston of a cylinder head having a space communicating with the cylinder and within which space the ignition of the fuel takes place, a main valve for admitting air to the cylinder, and an auxiliary valve for admitting air to said space at a point in each cycle of the engine during normal operation, substantially as described.

2. In a hydro-carbon engine, the combination with the cylinder and piston, of a cylinder head, provided with a space to which fuel is fed and within which the fuel is burned, and a valve located near the extremity of said space, said valve being adapted to admit fresh air into said space during each suction stroke of the piston, substantially as described.

3. In a horizontal engine of the type in which liquid fuel is directly inhaled on the suction stroke, the combination of a head having a relatively long horizontal passage communicating with the space at the end of the piston, a main air inlet valve, a fuel igniting cup projecting into said passage, and an automatically operating auxiliary admission valve located at the closed end of said passage for admitting a small quantity of fresh air to the passage on the suction stroke of the piston during the normal operation of the engine, substantially as described.

Signed at Chicago, Ill., this 30th day of April, 1918.

EDWARD B. BLAKELY.

Witness:

T. D. BUTLER.