E. B. BLAKELY.

FUEL VALVE.

APPLICATION FILED MAY 3, 1918.

1,285,907. Patented Nov. 26, 1918.

Fig. 1

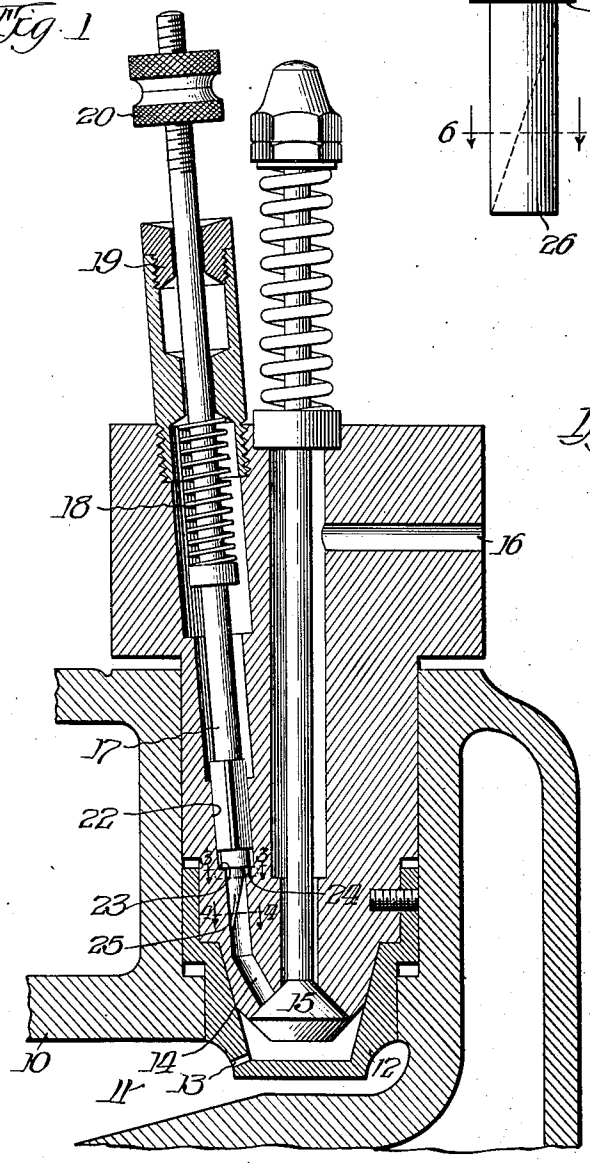


Fig. 5

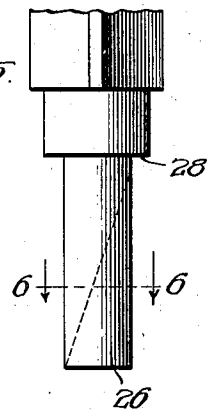


Fig. 2

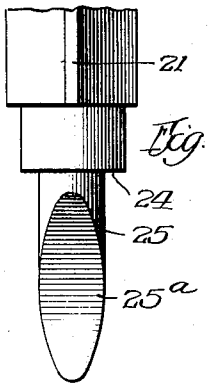


Fig. 6

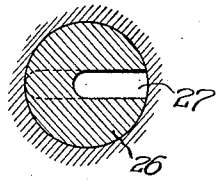
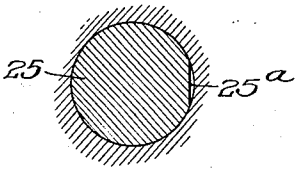


Fig. 3



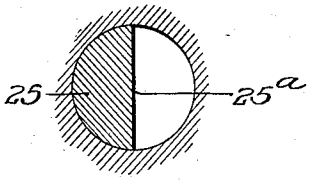


Fig. 4

Witness:

Inventor

Edward B Blakely

By Chas F Murray Atty.

UNITED STATES PATENT OFFICE.

EDWARD B. BLAKELY, OF CHICAGO, ILLINOIS, ASSIGNOR TO R. M. HVID COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MICHIGAN.

FUEL-VALVE.

1,285,907. Specification of Letters Patent. Patented Nov. 26, 1918.

Application filed May 3, 1918. Serial No. 232,227.

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 Fuel-Valves, of which the following is a specification.

My invention relates to hydrocarbon engines and particularly to engines of the type in which liquid fuel is directly supplied to the cylinder on the suction stroke.

In engines of the type referred to it is common to employ a fuel-receiving cup which projects into the compression space of the cylinder, the cup communicating with such space by means of one or more minute apertures. Liquid fuel and a small quantity of air are admitted on the suction stroke of the engine by the opening of a valve, usually of the puppet type, located within the cup. However, the feeding of liquid fuel to the point of control by the puppet valve must be separately controlled by a needle or similar valve. Inasmuch as the amount of fuel utilized in each cycle of the engine is extremely small, the regulation must be accurate. To this end I have designed a valve to replace the ordinary needle valve, by means of which much more efficient action is secured. It will be understood that in the ordinary commercial installations, the valve for regulating the amount of fuel is controlled by a governor, the valve being retained at all times in a partially open position.

The desired result is secured by forming the valve with a tapered extremity, the taper being in the form of a plane cut intersecting the cylinder at an acute angle, the base of the cut terminating substantially at a square shoulder which acts on a similarly shaped seat in order to entirely close the round orifice. In practice it has been found that more accurate regulation can be secured particularly on the smaller sizes of engines. There is also less likelihood of clogging by the presence of foreign matter between the valve and its seat, this for the reason that if the particle lodges on the seat the valve may be substantially entirely closed even without the flat seats being in contact, the round base of the valve at a point contiguous to the seat being complete and entirely closing the escape opening. The foreign matter cannot lodge in the space between the inclined portion of the valve and the sides of the aperture for the space tapers downwardly instead of upwardly as in the ordinary needle valve.

The invention will be more readily understood by reference to the accompanying drawings, in which,

Figure 1 is an enlarged cross sectional view showing a valve constructed in accordance with my invention;

Fig. 2 is an elevation of the valve member;

Fig. 3 is a sectional view much enlarged, on the line 3—3 of Fig. 1;

Fig. 4 is a similar view on the line 4—4 of Fig. 1;

Fig. 5 is an enlarged side view of a slightly modified form thereof, and,

Fig. 6 is a sectional view on the line 6—6 of Fig. 5.

In the drawings the cylinder is indicated at 10, the same being provided with a combustion space 11. Projecting on this space is a fuel cup 12, having an aperture 13, through which the fuel escapes to the cylinder. Fuel is admitted to the cup through the passage 14, the outlet of which is controlled by a puppet valve 15. The opening of the valve in consonance with the operation of the engine serves to admit the fuel and a small quantity of air which enters through the port 16. The amount of fuel permitted to pass through the conduit 14, is controlled by a valve having a stem 17, normally held in seated position by means of a spring 18, the upper end of the stem being packed and held by means of a gland nut 19. A governor arm, (not shown) or other controlling means may engage the nut 20, on the upper end of the valve stem in order to control the position of the valve.

The valve at its lower end is flattened or squared, as at 21, and guided within a contracted portion 22, of the bore. The bore is again contracted to the size of the passage 14, the shoulder 23, at the junction of the two bores serving as a seat for the flat extremity 24, of the stem. The terminal portion 25, of the stem is round and constitutes the valve member. This round or cylindrical portion is intersected by a plane cut 25^a extending at an acute angle from the extremity of the cylinder to a point close to the seat or shoulder 24. Thus at the base the cylinder is complete and snugly fits the aperture in which it is seated. The taper

or angularity of the cut may be changed as desired in order to secure finer or coarser regulation. At any rate it will be seen that the valve snugly fits the aperture in all positions and on the side opposite the cut there is no opportunity for the lodgment of any particles of foreign matter. On the opposite side however, the taper is away from the seat and no particles can lodge in the opening. Even if particles should lodge on the seat the valve may be completely closed without the valve being seated.

In the modified form shown in Figs. 5 and 6, a similarly advantageous construction is presented. In this form the round end portion 26, of the valve member is circumferentially complete to its extremity. However, a narrow cut 27, is provided which extends diagonally from the extremity to a point near the shoulder or seat 28, and the same result is secured. This has the advantage of positively preventing the lodgment of any particles of dirt or foreign matter between the valve and its seat. The round end portion 26, fits snugly within the outlet and there is no opportunity for lodgment of dirt therearound.

The advantages in the use of a valve of this type are many and will be apparent to those skilled in the art. Not the least of these is the simplicity and ease of construction and the ease with which the valve may be ground to a seat.

I claim:

1. A valve member for engagement with a circular aperture comprising a cylindrical end terminating in a shoulder adapted to act as a seat, the end portion being tapered on a plane extending diagonally of the axis of the valve member, the taper ending at a point removed from the seat whereby the portion of the end adjacent to the seat is circumferentially complete, substantially as described.

2. In fuel feeding means for oil engines, the combination with fuel igniting means, of a liquid fuel feeding valve comprising a stem fitted within a conduit through which fuel is supplied, means on the stem for guiding the same and permitting the passage of fuel along the same, the extremity of the stem being pointed by means of a plane cut, substantially as described.

3. In a fuel feeding device, the combination of a casing having a longitudinal passage and a port, a stem fitted in said passage and adapted for longitudinal reciprocation therein, said stem being provided with means for guiding the same, said means being arranged to permit the passage of oil therearound, the extremity of the stem being provided with a tapered portion formed by a plane cut, the tapered portion projecting into the port, substantially as described.

4. In a fuel feeding device for oil engines, the combination of a casing having an oil admission passage terminating in an exit port, a valve stem mounted in said passage, said stem being adapted for bodily longitudinal reciprocation, and being provided with a portion which is angular in cross section, said portion acting as guiding means for the stem, the extremity of the stem being provided with a transverse cut adapted to project into the port and to control the amount of fuel fed, substantially as described.

5. In a fuel feeding device for oil engines, the combination of a casing having an oil admission passage terminating in an exit port, a valve stem mounted in said passage, said stem being adapted for bodily longitudinal reciprocation, and being proaided with a portion which is angular in cross section, said portion acting as guiding means for the stem, the portion of the stem adjacent one end being shaped to provide a square shoulder, the terminal portion of the stem being tapered by means of a plane cut, substantially as described.

6. In a fuel feeding device for oil engines, the combination of a casing having an oil admission passage terminating in an exit port, a valve stem mounted in said passage, said stem being adapted for bodily longitudinal reciprocation, and being provided with a portion which is angular in cross section, said portion acting as guiding means for the stem, the portion of the stem adjacent one end being shaped to provide a square shoulder, the terminal portion of the stem being tapered by means of a plane cut, the taper ending at a point removed from the shoulder whereby the portion of the same adjacent to the shoulder is circumferentially complete, substantially as described.

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

EDWARD B. BLAKELY.

Witness:
T. D. BUTLER.