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G. BECK

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VALVE FOR INTERNAL COMBUSTION ENGINES

Filed Dec. 16, 1929

Fig. 1

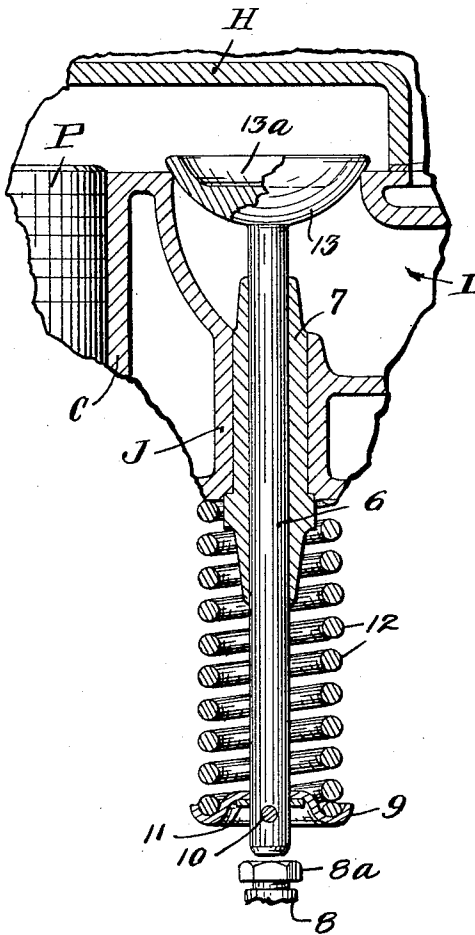


Fig. 3

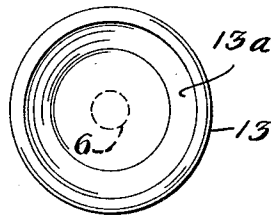
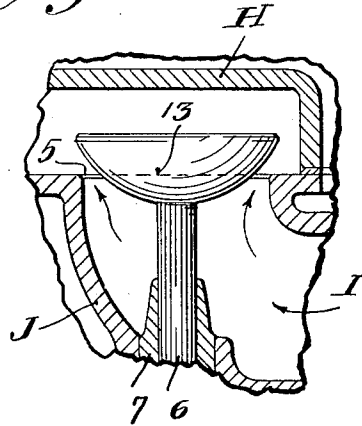


Fig. 2



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GUSTAF BECK, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF FORTY-NINE ONE-HUNDREDTHS TO GEORGE O. DARROW, OF MISSION SAN JOSE, CALIFORNIA

VALVE FOR INTERNAL COMBUSTION ENGINES

Application filed December 16, 1929. Serial No. 414,425.

This invention relates to valve construction and especially to valves for internal combustion engines.

It is an object of my invention to provide an improved valve for internal combustion engines, which will close perfectly against its seat and which will be free from carbon whereby greater compression within the cylinder is attained, resulting in greater power and more uniform operation of the engine or motor and consequently economizing in the use of fuel.

It is a further object to provide a valve for internal combustion engines which will be self-adjusting relative to its seat and thus insuring minimum leakage and which is so constructed as to have a very narrow contact with its seat and regardless of whether the head or stem of the valve is displaced, tilted or oscillated will always find a perfect seat.

A further object of my invention is to provide a valve so constructed to cause the volatile fuel to be instantly admitted into the cylinder head, means being provided for guiding the volatile fuel in the shortest path of travel.

Another object is to provide valve structure wherein neither the valve head nor the seat has surfaces on which grit, dirt or carbon may lodge.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawing, wherein like reference characters refer to similar parts throughout the several views and wherein,

Fig. 1 is a vertical section through a portion of an internal combustion engine, showing one of my valves applied to the fuel intake passage, said valve being in seated position;

Fig. 2 is a similar fragmentary view showing the valve in open position; and

Fig. 3 is a top plan view of the valve detached.

My valve is applied to the fuel intake passage I of an internal combustion engine, the usual detachable cylinder head H being secured to the cylinder block above the piston

P, said piston working in the cylinder C, which cylinder is surrounded by the usual water jacket J.

The upper end of intake passage I terminates in a very narrow annular valve seat 5 to form a substantially line or edge contact with the valve head. The valve comprises the usual slidable stem 6 sliding freely in an elongated guide or bearing 7 which is secured in the usual manner in the engine block alined with the center of valve seat 5. The lower end of valve stem 6 is adapted to be engaged by means of the adjustable head 8a of a tappet 8, which tappet is controlled by means of a cam (not shown). An annular spring seat 9 surrounds the lower portion of valve stem 6 and is connected therewith by means of a diametric pin 10 and a washer 11, and a coiled spring 12 surrounds stem 6 and is interposed between spring seat 9 and a shoulder provided below the water jacket and adjacent the lower end of valve stem guide 7, said spring urging the valve against its seat.

My valve head 13 is rigidly connected with the upper end of valve stem 6 and may be, if desired, integrally formed therewith and comprises a true segment of a sphere. I prefer to use a segment of between 120 and 145°, although this may be varied, all within the scope of the invention. The segment is of such size that the major portion thereof will be disposed below the narrow valve seat 5 and the inclined narrow seat is formed to precisely fit the contour of the spherical segment.

I prefer to recess the top of the valve head at 13a as clearly shown in Figs. 1 and 3, thereby decreasing the weight of the valve.

It has been found that valves will seat with greater certainty if the area of the seat is reduced. The common construction of valve employs a beveled seat and a valve having a relatively wide, straight bevel which is wedged into the seat. This construction affords surfaces of considerable area on which the carbon and foreign material may lodge, holding the valve partially open and preventing adequate compression.

With my valve, the area of the seat is extremely small and will not accumulate carbon or grit. Carbon, furthermore, will not col-

lect or adhere to the external surface of the valve head 13, since it is a smooth spherical surface. The valve head, therefore, in its movement will not carry carbon or grit to the seat. The spherical surface of the valve head is preferably hollow.

My valve head will always find a perfect seat regardless of whether the stem is bent slightly out of alinement or whether the guide becomes loose through wear, due to the fact that the zone of the spherical head engaged by the seat will be precisely the same in shape regardless of whether the longitudinal center line of the stem is tilted relative to the axis of the seat. It will also be obvious that a slight oscillation of the valve will not effect its perfect operation, because of the substantially edged contact of the narrow seat with the spherical head.

In Fig. 2 where the valve is illustrated in open position the function of the spherical segment head in directing passage of fuel instantly through the valve opening is shown. The gases or vaporized fuel striking the convex surface of the valve head is made to travel in substantially a direct path through the space between the valve and valve seat. In this connection, it will be noticed that a slight elevation of my spherical valve head effects an opening of considerably greater area between the valve head and the seat than in the common type of valve extensively used at this time, wherein the seating surface is substantially in the shape of a truncated cone.

Due to the above stated facts, when used either as an intake or exhaust valve the gases will pass more quickly through the valve opening insuring a smoother operation of the engine and economy in the consumption of fuel.

When used as an exhaust valve, since the valve opening is greater, for a predetermined lift of the valve, than the truncated conical valves extensively used at this time, it follows that the exhaust gases will be expelled practically instantaneously and that danger of overheating through back pressure and exhaust gas left in the cylinder head will be greatly reduced, if not entirely eliminated. If properly adjusted, my valve in the exhaust passage will effect a substantially instantaneous discharge of the gases after the firing stroke of the engine.

From the foregoing description it will be seen that I have invented an improved valve which will seat perfectly and be self-adjusting relative to its seat, which will be practically free from carbon and which will provide a greater valve opening for a predetermined lift than valves now in extensive use.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the

parts without departing from the scope of the invention.

What is claimed is:

1. In valve structure, a reciprocable valve comprising a true segment of a sphere having a smooth spherical contacting surface and an annular valve seat having an internal circular contact edge making substantially line or edge contact with said spherical surface when the valve is in closed position.

2. In valve structure, a valve comprising a true segment of a sphere having a smooth spherical contacting surface, an annular valve seat having an internal circular contact edge making substantially line or edge contact with said spherical surface when the valve is in closed position and a reciprocable valve stem rigidly secured to said spherical valve and substantially axially aligned with said valve and said seat.

In testimony whereof I affix my signature.
GUSTAF BECK.