June 2, 1925. 1,540,031

H. E. NETTE

SELF SEATING VALVE FOR INTERNAL COMBUSTION ENGINES

Filed Aug. 2, 1924

Fig. 1

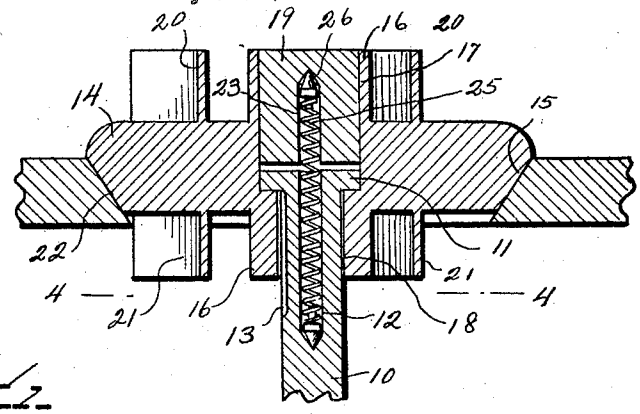


Fig. 2

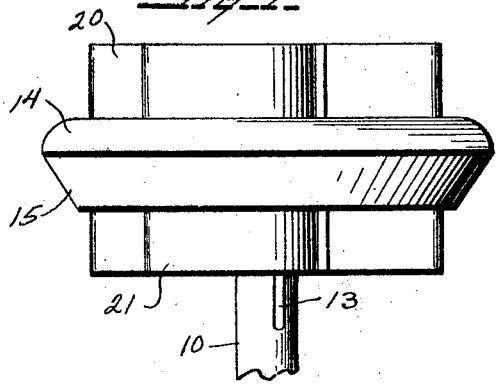


Fig. 3

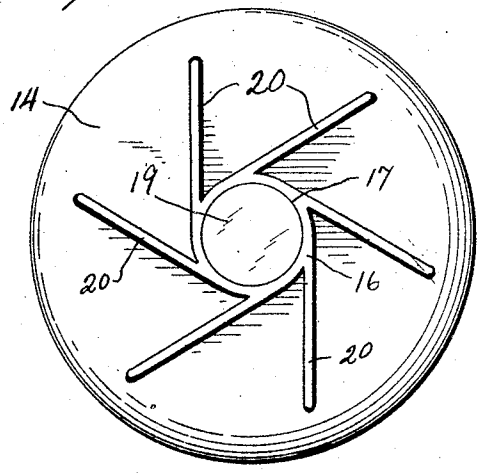
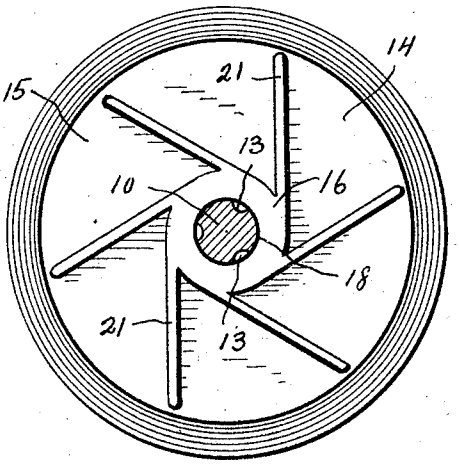


Fig. 4



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Patented June 2, 1925. 1,540,031

UNITED STATES PATENT OFFICE.

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SELF-SEATING VALVE FOR INTERNAL-COMBUSTION ENGINES.

Application filed August 2, 1924. Serial No. 729,747.

To all whom it may concern:

Be it known that I, HERMAN E. NETTE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Self-Seating Valves for Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to poppet valves such as are used in internal combustion engines, and the general object of the invention is to provide a valve which may be used either as the intake or exhaust valve of such engines and which will act to grind its own seat, that is a valve which will be automatically rotated so that thus new surfaces will be presented each time that the valve comes to its seat.

A further object is to provide a construction of this character in which the valve is provided with wings both upon its upper and lower surface, these wings being so formed that the head of the valve will rotate upon the stem and with reference thereto.

A still further object is to provide means for eliminating any rattling of the loose valve head when the valve comes back to its seat.

Another object is to provide a valve construction of this character which is such that it will assure a smooth rotation without much wabbling and at the same time will allow ample freedom for the valve head to find its seat automatically.

Still another object is to provide a valve having a loose valve head which will properly re-seat even though the valve stem be warped, and in which rotary motion at all times is assured, which rotary motion of the valve head smooths and cleans the tapered contacting edges of the valve and seat, thus securing a more perfect combustion with no backfiring and reducing carbonizing to a minimum.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is an elevation of a valve for internal combustion engines constructed in accordance with my invention;

Figure 2 is a transverse sectional view through the valve;

Figure 3 is a top plan view of the valve;

Figure 4 is a section on the line 4—4 of Figure 2.

Referring to these drawings, it will be seen that 10 designates a valve stem having at its inner end an enlarged circular head 11 and being formed with a longitudinally extending bore 12. At a plurality of points this stem just beneath the head is longitudinally grooved, as at 13. Mounted upon this stem is the valve head proper 14 which has the beveled peripheral face 15 adapted to contact with the valve seat, this valve head being formed with an upstanding annular hub 16 on its top and a depending annular hub 16 on its bottom.

The valve head 14 is recessed at 17, the recess extending down nearly to the lower face of the valve head 14, and the head 11 of the valve stem fits within this recess. The shank 10 of the valve stem fits within the bore or recess 18 of the valve head and has a clearance of about $\frac{1}{64}''$. A plug 19 is disposed in the upper end of the countersink or recess 17 and there is a space of about $\frac{1}{32}''$ left between the lower face of this plug and the upper face of the head 11 just enough so as to permit the valve head to have free rotation on the stem and also permit the valve head to have limited longitudinal movement relative to the stem. The upper face of the valve head is formed with a plurality of wings or vanes 20 which are tangential to the annular wall of the recess 17 and the under face of the valve is also provided with vanes 21 of the same character as the vanes 20. The valve may, as before remarked, be the intake valve of the motor or the exhaust valve thereof and the beveled face 15 fits against the seat 22 of the valve casing.

Disposed within the bore 12 and in a like bore 23 formed in the plug 19 is a coiled compression spring 25, which at its ends is engaged with and bears against two pointed or tapering heads 26 which engage the tapered or pointed ends of the bores 12 and 23. This spring is intended to prevent any rattling of the loose valve head when the valve comes back to its seat and assures a

smooth rotation of the valve head without wabbling and at the same time allows plenty of freedom for the valve head to find its proper seat automatically.

While I have designed this valve with particular reference to its use on internal combustion engines and regard it as particularly valuable for this purpose, I do not wish to be limited thereto as it is obvious that the valve might be used in other situations. In the operation of this valve where it is used either as an intake or exhaust valve, the passage of the motive fluid around the valve upon the opening thereof, due to the suction of the engine or to the exhaust of the engine, causes the valve head to rotate, the stem being free from rotation because of the clearance, and this causes the valve to reseat in a new position each time that it closes. Furthermore, there will be a slight rotation of the valve just after it reaches its seat, which will keep the seat 22 clean and clear from carbon and other foreign accumulation and will keep the beveled edge clean and free from accumulations. This act of seating the valve and the cleaning of the seat and edge 15 tends to secure more perfect combustion, prevents backfiring, secures economy in gas consumption, and reduces carbonization to a minimum. It will be seen that this valve is cheaply constructed and may be very readily installed.

The bore 12 in the stem tends to prevent warping of the stem as this bore passes through the larger part where the stem usually warps. The grooves 13 are lubricating grooves and are particularly advantageous in order to secure free motion. The valve head has the fins or vanes 20 and 21 on the top and bottom, the top vanes being provided for favoring an early start of the rotation by the exhaust. The tangential arrangement of the fins or blades assures rotation, no matter from which angle the gas strikes the valve head. At the same time these fins or blades act to strengthen the valve head, thus making the valve head incapable of warping. The valve may be cast or drop forged in one piece or the fins can be otherwise attached.

It will be understood, of course, that the plug 19 is to have a driving or press fit within the valve head 16 and that there is sufficient clearance between the head 11 and the plug 19 as will permit free movement of the stem 10.

I claim:—

1. A valve for internal combustion engines having a head and a stem, the head having limited longitudinal movement on the stem, and a spring urging the head in a direction away from the stem.

2. A valve for internal combustion engines having a head and a stem, the head being mounted upon the stem for limited longitudinal movement and for rotation around the stem, and resilient means yieldingly urging the head in a direction away from the stem.

3. A valve of the character described comprising a stem and a head mounted thereon for rotation, the head having vanes whereby the passage of fluid past the head will cause a rotation of the head, the head and stem being formed with opposed bores, a compression spring disposed in said bores, and pointed heads bearing against the ends of the bores and against which the compression spring bears.

4. A valve of the character described comprising a head and a stem, the head being rotatable upon the stem and the stem being provided with longitudinally extending oil grooves extending into the head, the upper and lower faces of the head being provided with vanes tangential to a circle concentric to the axis of the head and stem.

5. A valve for internal combustion engines comprising a stem formed at one end with an integral head, the stem being longitudinally bored at the headed end, a valve head formed with a countersunk recess on one face and a bore extending inward from the other face and communicating with the countersunk recess, the stem loosely fitting within the bore and the head of the stem loosely fitting within the countersunk recess, a plug fitting within the countersink of the valve head and opposed to the head on the stem, the plug being longitudinally bored, a spring disposed in the bore of the plug and of the stem and having terminal members rotatably engaging the end walls of the two bores, the valve being provided with tangentially extending vanes on its upper and lower surfaces.

6. A valve for internal combustion engines comprising a stem formed with a head at one end, a valve proper, one face of the valve having a longitudinally extending recess and the other face of the valve having a bore opening into said recess and fitting the stem, the recess fitting the head and the stem being disposed with the head within the recess, a plug disposed within the recess and having its inner face spaced from the inner face of the head whereby to permit limited longitudinal movement of the valve upon the head of the stem, the adjacent ends of the stem and plug being longitudinally bored, and a spring disposed within said bores and urging the valve in a direction away from the head.

7. A valve for internal combustion engines having a head and a stem, the head being mounted upon the stem for rotation thereabout and for limited longitudinal movement, means yieldingly urging the head in a direction away from the stem, and vanes mounted upon the head and adapted to cause

the rotation of the head relative to the stem when fluid flows past the head.

8. A valve for internal combustion engines having a head, the head having a longitudinally extending bore, and a countersink into which the bore opens, a stem formed with a head, the stem being disposed through the bore and the head being disposed in the countersink in the valve head, a plug disposed in said countersink, the inner face of the plug being spaced from the adjacent face of the stem head, and resilient means urging the valve head away from the stem.

In testimony whereof I hereunto affix my signature.

HERMAN E. NETTE.