A. O. DADY.

VALVE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JAN. 2, 1918.

1,294,417. Patented Feb. 18, 1919.

Fig. 1

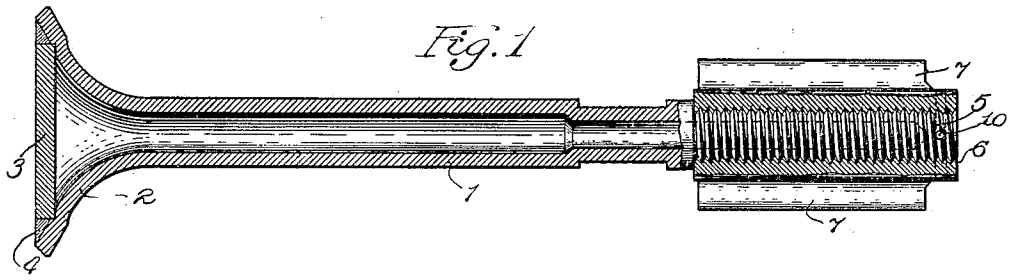
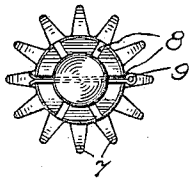


Fig. 2



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UNITED STATES PATENT OFFICE.

ARTHUR O. DADY, OF NEW YORK, N. Y., ASSIGNOR TO PFANSTIEHL COMPANY, INCORPORATED, OF NORTH CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK.

VALVE FOR INTERNAL-COMBUSTION ENGINES.

1,294,417. Specification of Letters Patent. Patented Feb. 18, 1919.

Application filed January 2, 1918. Serial No. 209,890.

To all whom it may concern:

Be it known that I, ARTHUR O. DADY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Valves for Internal-Combustion Engines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in valves for internal combustion engines, and is particularly concerned with hollow exhaust valves of the so-called mercury cooled type in which a small quantity of mercury held in the head of the valve is vaporized when the valve head becomes heated, the vapor being condensed upon the walls of the valve stem and returned to the valve head. In order to insure the most efficient cooling action in valves of this type it is necessary to provide means for quickly radiating the heat from the valve stem. Various expedients have been employed for this purpose, and the objects of my invention are, first, to provide a radiator having intimate contact with the valve stem, whereby the resistance to the radiation or conduction of heat is reduced to a minimum; second, to provide a radiator adapted to be detachably connected with the valve stem; third, to provide a radiator of the class described which will not materially increase the weight of the valve. Further objects will appear as the description progresses, reference being had to the accompanying drawings, in which—

Figure 1 is a view partially in central longitudinal section and partially in elevation, of my improved valve; and

Fig. 2 is an end elevation thereof looking toward the radiator end of the valve.

Similar characters of reference refer to similar parts in the two views.

Referring to the drawings, the reference character 1 indicates a hollow valve stem having one end flared as shown at 2 and closed by a metal disk 3, which is secured in place by brazing or in any other suitable manner, as indicated at 4. The opposite end of the stem is provided with a screw thread 5, the screw-threaded portion also being hollow as indicated by the dotted lines. The radiator for my valve comprises a sleevelike member having an internally threaded bore 6 for receiving the screw threads of the valve stem. Spaced longitudinal ribs 7 extend from the sleeve member and provide efficient means for radiating the heat. The extreme end of the valve stem opposite the head is of course closed and the end of the radiator adjacent this end of the stem is provided with a plurality of diametrical slots 8, which are adapted to receive a cotter pin 9 that extends through a hole 10 in the closed end of the valve stem.

In practice I prefer to form the valve stem and head from steel or some of the steel alloys usually employed for this purpose, and to form the radiator from aluminum. Inasmuch as the co-efficient of expansion of aluminum is practically twice that of steel, when the valve stem and the radiator become heated the radiator will tend to expand away from the valve stem, whereby the intimate contact between the inner wall of the radiator and the valve stem will be partially destroyed, thereby increasing the resistance to the conduction of heat from the valve stem to the radiator. However, at the same time that the radiator increases in diameter, it likewise increases in length to a greater extent than does the threaded portion of the valve stem, and consequently the sides of the screw threads on the radiator are forced into intimate contact with the sides of the screw threads on the valve stem, and thereby maintain an intimate contact between the valve stem and the radiator. The screw threads upon the valve stem and the radiator, therefore, co-act to compensate for the differences in expansion between the two members.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A valve comprising a stem, one end of which is provided with screw threads in combination with a radiator comprising a member having spaced ribs and a screw-threaded bore for receiving said screw-threaded stem, and means for locking said radiator to said stem, the metal of said radiator having a larger co-efficient of expansion than the metal of said stem.

2. A valve comprising a hollow steel stem provided with screw threads in combination

with an aluminum radiator having a screw-threaded bore for receiving said threaded stem.

3. A valve comprising a valve stem in combination with a radiator surrounding a portion of said stem, the metal of said radiator having a larger co-efficient of expansion than the metal of said stem, and co-acting means on said stem and radiator for compensating for the differences between the co-efficients of expansion of said metals.

4. A valve comprising a valve stem in combination with a radiator surrounding a portion of said stem, the metal of said radiator having a larger co-efficient of expansion than the metal of said stem, and means for compensating for the differences between the co-efficients of expansion of said metals.

In witness whereof, I hereunto subscribe my name this 21st day of December, A. D. 1917.

ARTHUR O. DADY.

Witnesses:
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V. A. Dady.