

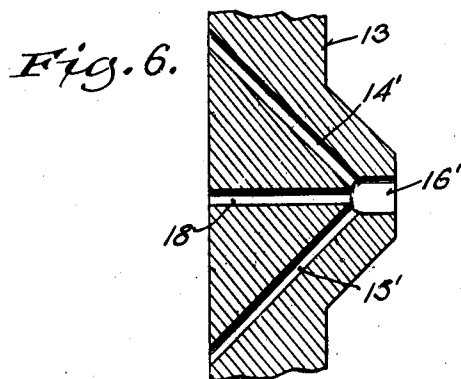
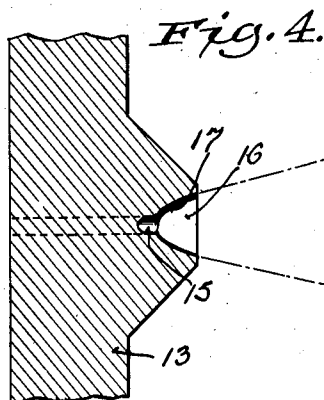
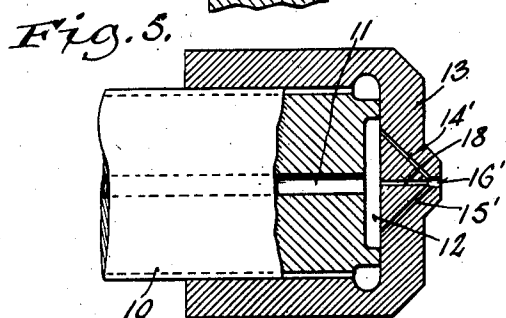
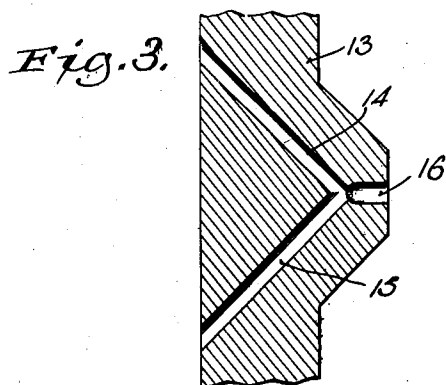
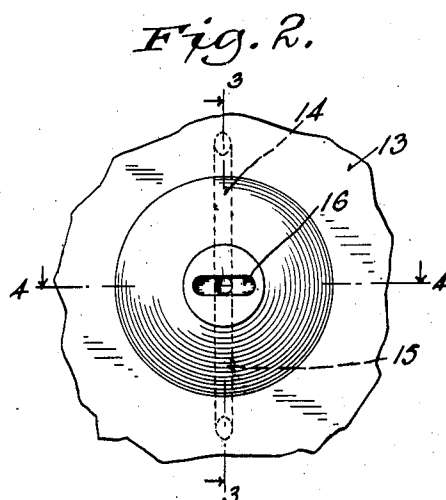
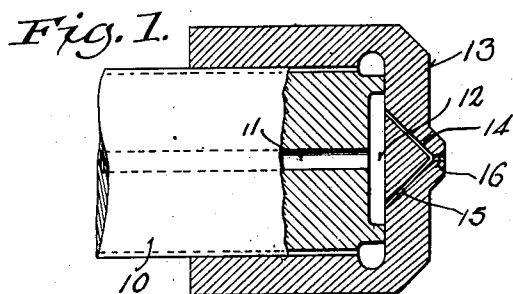
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1,569,448

O. A. BANNER

FUEL INJECTION NOZZLE FOR OIL ENGINES

Filed May 19, 1924



INVENTOR.

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BY

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UNITED STATES PATENT OFFICE.

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FUEL-INJECTION NOZZLE FOR OIL ENGINES.

Application filed May 19, 1924. Serial No. 714,266.

To all whom it may concern:

Be it known that I, OTTO A. BANNER, a subject of the Empire of Germany, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Fuel-Injection Nozzles for Oil 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 fuel injection nozzles for oil engines.

One object of the present invention is the provision of a fuel injection nozzle capable of producing a substantially homogeneous fuel spray of definite form.

Other objects and advantages of this invention will appear from the following description of two illustrative embodiments thereof.

Figure 1 is a sectional view, on an enlarged scale, of a fuel injection nozzle constructed in accordance with the present invention.

Figure 2 is an end elevation, on a still larger scale, of a portion of the nozzle shown in Figure 1.

Figure 3 is a sectional view taken substantially along the line 3—3 of Figure 2.

Figure 4 is a sectional view taken substantially along the line 4—4 of Figure 2.

Figure 5 is a view similar to Figure 1 of an injection nozzle of modified form.

Figure 6 is a sectional view similar to Figure 3 of the nozzle shown in Figure 5.

Each of the nozzles shown comprises a plug 10 having a longitudinal feed passage 11 therein communicating with a basin or chamber 12 formed in the end face thereof. A cap 13 fixed to the end of the plug closes the chamber 12. In the nozzle shown in Figures 1 to 4, the cap 13 is provided with two convergent ducts 14 and 15 lying in an axial plane of the plug 10 and communicating with chamber 12. A cavity 16 formed in the exposed end face of the cap 13 communicates with the convergent ends of the ducts 14 and 15. This cavity is of substantially flat form and lies in a plane substantially normal to the plane of the ducts 14 and 15.

The arrangement is such that liquid fuel, delivered to and through passage 11 and chamber 12 under pressure of about two or

three hundred kilograms per square centimeter, passes at high velocity through the ducts 14 and 15 so as to form two impacting fuel jets which cooperate to form a substantially flat fuel spray issuing from the cavity 16. The curved edge wall 17 of the cavity substantially conforms to the spray. This wall 17 confines the spray laterally so as to give the spray a substantially definite outline somewhat as indicated by the dot-and-dash line of Figure 4. By properly coordinating the size and inclination of the ducts 14 and 15 and the shape of the cavity 16, a well defined spray of a form and character well adapted for the purposes at hand may be obtained.

The injection nozzle shown in Figures 5 and 6 is similar in many respects to that just described except that in addition to the two convergent ducts 14' and 15' a third substantially axial duct 18 is provided in the cap 13. These three ducts are arranged to discharge three fuel jets which meet at a common point substantially within a similar cavity 16'. It has been found that when only two ducts are employed the fuel tends to wear away the surfaces of the cavity due to the high injection pressures and high velocities involved. This results in a variation in the form and character of the spray. By the use of a third duct, such as described, this difficulty is avoided, so that even when the nozzle is made of very soft steel the spray retains its form and character over long periods of time.

Various changes may be made in the embodiment of the invention hereinabove described, without departing from or sacrificing any of the advantages of the invention as defined in the appended claims.

I claim:

1. In a fuel injection nozzle for oil engines the combination of a member having a plurality of convergent fuel ducts therein lying in a common plane, means for delivering liquid fuel to said ducts, and a substantially flat cavity in the exposed end face of said member and lying in a plane substantially normal to the plane of said ducts, said cavity communicating with said ducts and having a laterally confining edge wall intersecting said end face to form a fuel spray of definite form.

2. In a fuel injection nozzle for oil engines the combination of a member having a pair

of convergent fuel ducts therein lying in a common plane, means for delivering liquid fuel to said ducts, and a substantially flat cavity in the exposed end face of said member and lying in a plane substantially normal to the plane of said ducts, said cavity communicating with said ducts and having a laterally confining edge wall intersecting said end face to form a fuel spray of definite form.

3. In a fuel injection nozzle the combination of a member having a pair of convergent fuel ducts therein lying in a common

plane and a third duct between and in the plane of said pair of ducts, means for delivering liquid fuel to said ducts, and a substantially flat cavity in the exposed end face of said member lying in a plane substantially normal to the plane of said ducts, said cavity communicating with said ducts and having a curved edge wall intersecting said end face to form a fuel spray of definite form.

In witness whereof, I hereunto subscribe my name this 17th day of May, 1924.

OTTO A. BANNER.