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LIQUID FUEL INJECTION NOZZLES

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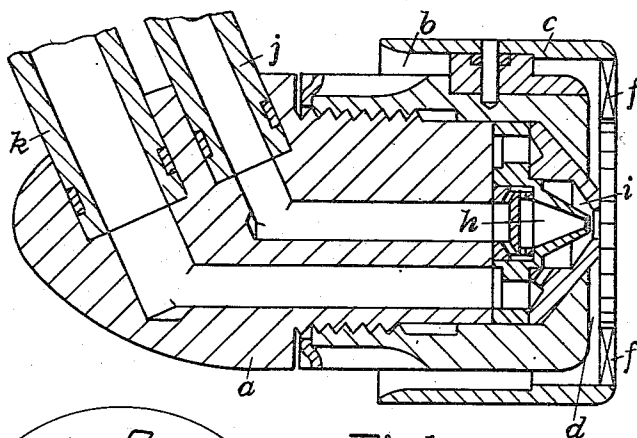


Fig. 1

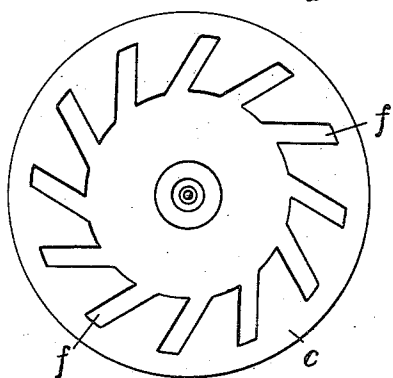


Fig. 2

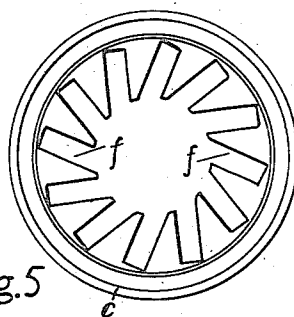


Fig. 5

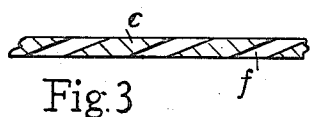


Fig. 3

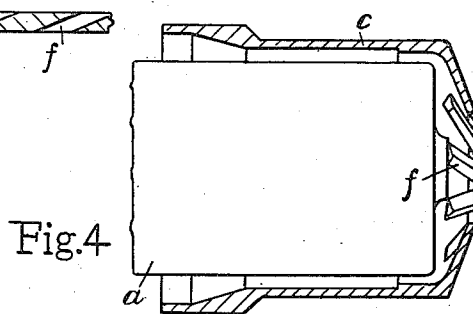


Fig. 4

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LIQUID FUEL INJECTION NOZZLES

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1 Claim. (Cl. 158—76)

This invention relates to liquid fuel injection nozzles of the swirl-type for use in the combustion chambers of jet engines, gas turbines or other like purposes.

To minimise soot formation on the discharge end of the nozzle, it is already known to provide on the said end a pair of air passages whereby one stream of air can be directed inwards towards the emerging fuel, and another adjacent stream has imparted to it a swirling motion.

The present invention has for its object to enable the two air streams to perform their purpose in a more effective manner than heretofore.

The invention comprises a nozzle having combined with its outer end a pair of air passages both of which are fed from a common annular passage around the nozzle, one of the passages being adapted to direct an air stream inwards across the nozzle and the other being formed by an annular arrangement of slots which are open at both sides and are adapted to impart a rotary motion to the air stream passing therethrough.

In the accompanying drawings:

Figure 1 is a sectional side elevation and Figure 2 an end elevation of a nozzle embodying the invention.

Figure 3 is a sectional view illustrating diagrammatically the slots forming one of the air passages.

Figure 4 is a part sectional side elevation and Figure 5 an end view illustrating a modification of the nozzle shown in Figure 1.

Referring to Figures 1-3, there is formed around the exterior of the main part *a* of the nozzle an annular air passage *b* adapted to receive air from the air stream normally flowing over the nozzle, this passage being formed by a sleeve *c* placed over the nozzle. The front end of the sleeve is of annular form and extends across a part of the front end of the nozzle, the said end of the sleeve being spaced from the nozzle to provide a passage *d* through which an air stream from the annular passage *b* can flow inwards towards the fuel delivery orifice of the nozzle. Also in the said end of the sleeve

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is formed an annular arrangement of slots *f* which are open at each side and are situated opposite or adjacent to the said annular air passage *b*. The slots are shaped and disposed as shown in Figure 3 so that they can impart a rotary motion to the stream passing through the slots. Further the slots may be radially disposed or, alternatively (and as shown in Figure 2) they may be so inclined that they can impart an additional radially-inward component of motion to the stream passing through them.

In the modified construction shown in Figures 4 and 5, the front end of the sleeve *c* is made of annular and truncated conical form. Otherwise it is essentially similar to the construction shown in Figures 1-3.

As regards the example of the nozzle *a* shown in Figure 1, this comprises a pair of coaxial swirl chambers *h*, *i* fed by separate fuel pipes *j*, *k*, but as the details of construction form no part of the present invention no further description is necessary. Moreover, the invention is not limited to a nozzle of the particular construction shown in Figure 1.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

A liquid fuel injection assembly comprising a body defining a nozzle having a discharge end, said discharge end including a substantially planar face, a sleeve mounted on and surrounding the body for at least a portion of its length and including the discharge end, with said sleeve being spaced from the perimeter of the body to provide an annular air passage between the said sleeve and the body, an inwardly directed annular end on the sleeve extending across a part of said planar face of the body in closely spaced relationship to said discharge end to define a passage substantially perpendicular to the annular air passage to allow air to flow inwardly from the annular air passage toward the discharge end of the said body, the annular end of the sleeve defining the end of the injection assembly said annular end of the sleeve being provided with a plurality of slots open at both sides, with a portion of said slots facing the annular passage and being shaped to impart rotary motion to air passing therethrough from the annular passage with the air emanating from the slots minimizing soot formation on the outer surface of the inwardly directed annular end of the sleeve.

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