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ATOMIZING STRUCTURE
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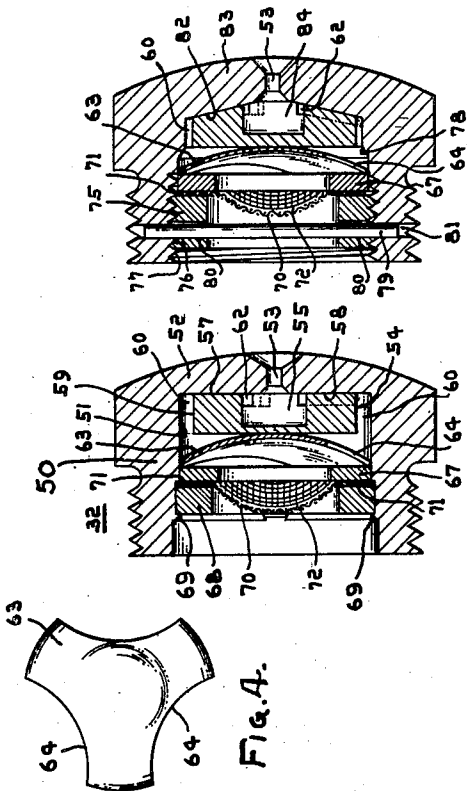


Fig. 1.

Fig. 4.

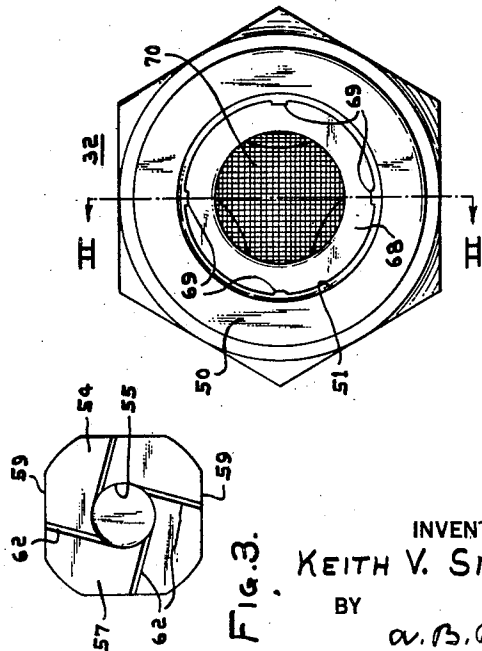


Fig. 2.

Fig. 3.

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ATOMIZING STRUCTURE

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3 Claims. (Cl. 299—120)

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This invention relates to liquid fuel-atomizing nozzles, more particularly to nozzles of that type for use in gas turbine power plants, and has for an object to provide an improved device of this character.

Another object of the invention is to provide a liquid fuel-atomizing nozzle of compact arrangement providing for minimum axial length thereof.

These and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is an enlarged longitudinal sectional view of a liquid fuel-atomizing nozzle constructed in accordance with the invention;

Fig. 2 is a rear end view of the structure shown in Fig. 1.

Fig. 3 is an end view of the front inner end of the nozzle core member;

Fig. 4 is an end view of the spring; and,

Fig. 5 is a view similar to Fig. 1 but illustrating a modified construction.

Referring now to the drawings in detail, particularly to Fig. 1, the nozzle 32 comprises a shell 50 having a cylindrical bore or chamber 51 therein, open at one end and closed at the opposite end by an end wall 52, provided with an emission opening 53 for discharge of liquid fuel.

Disposed within the chamber 51, in abutting relation to the end wall 52 thereof, is a disc-like core member 54 having in its inner surface a recess providing a swirl chamber 55, communicating with the emission opening 53 in the shell end wall 52. The core member 54 and the end wall 52 are provided with mating surfaces 57 and 58, respectively, providing a seal against flow of fuel therepast.

Preferably, the disc-like core member 54 is of a diameter only slightly less than that of the cylindrical chamber in which it is disposed. However, portions of the core member are cut away, as at 59, at the periphery thereof, to provide passages 60 for flow of fuel past the edge of the core member.

One of the mating surfaces, preferably the surface 57 of the core member, is provided with a plurality of grooves or passages 62 extending from the cut-away portions 59 inwardly to the swirl chamber 55, these passages communicating with the swirl chamber tangentially of the latter with the result that liquid fuel passing through such passages to the swirl chamber set up a swirling action of the fuel within said chamber,

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thereby promoting satisfactory atomization of the fuel leaving the chamber through the emission opening 53 in the shell end wall 52.

A concavo-convex disc spring 63 is disposed immediately rearwardly of the core member 54 with the apex or crown thereof in engagement with the rear wall of the core member and with its periphery or edges substantially abutting the side walls of the cylindrical chamber 51. The spring 63 is provided with a plurality of cut-outs 64 about its periphery (Fig. 4), thereby not only providing for flow of liquid fuel therepast, but also providing for increased flexibility or resiliency of the spring member.

The periphery or base of the spring 63 rests against a clamping ring 67, disposed rearwardly thereof and adapted to abut a retaining ring 68, which is held in assembled relation by upset portions of metal 69, integral with the inner wall of the cylindrical chamber 51.

Preferably, a filter member 70 having an annular flat flange 71 is disposed with said flange clamped between the clamping ring 67 and the retaining ring 68, the filter having a domed, central portion 72 serving to prevent passage of foreign matter, carried by the liquid fuel, to the swirl chamber 55.

The core member, the spring, the two rings, and the filter are assembled with the spring under compression, with the result that the spring holds the clamping ring in sufficiently tight engagement with the retaining ring to firmly clamp the filter therebetween and likewise forces the core member 54 against the end wall 52 of the shell 50 with sufficient force to prevent by-passing of fuel between the two mating surfaces 57 and 58.

It will be apparent that the arrangement just described provides a spray nozzle of relatively short over-all length while providing all the necessary elements in the form of swirl chamber, spring, and filter.

If it is desired to provide an assembly which may be dismantled for any reason, such as replacing the filter, etc., it may be preferred to use a structure such as illustrated in Fig. 5, which differs from the structure of Figs. 1 to 4, inclusive, mainly in that the retaining ring 75 is provided with external thread 76 engaging with mating threads 77 formed on the inner wall of the cylindrical chamber 78. Backing off or unthreading of the retaining ring is prevented by a cotter pin 79 disposed in mating bores 80 and 81 in the retaining ring and shell, respectively.

In Fig. 5 there is also illustrated a further change in that the inner face 82 of the shell end

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wall 83 is slightly conical, thereby providing for greater depth of the swirl chamber 84 than would be possible if the surface 82 were radial, as is the structure 58 in the construction of Fig. 1.

While the invention has been shown in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof.

What is claimed is:

1. A liquid fuel-atomizing nozzle comprising a shell having a chamber open at one end and closed at the opposite end by an end wall having an emission opening therethrough; a disc-like core member at the inner end of the shell chamber and having a swirl chamber communicating with the emission opening; a retaining ring in the shell chamber near the outer end thereof; retaining structure formed integral with the inner wall of the shell chamber and adapted to limit outward movement of the retaining ring; a fuel strainer having an annular flange adapted to rest against the inner radial face of the retaining ring; a clamping ring positioned inwardly of the fuel strainer and adapted to clamp the flange of the latter between the clamping ring and the retaining ring; and a disc-like concavo-convex spring compressed in the space between the clamping ring and the core member, whereby said spring urges the former into clamping engagement with the strainer flange and the latter into engagement with the shell inner end wall.

2. A liquid fuel-atomizing nozzle comprising a shell having a chamber open at one end and closed at the opposite end by an end wall having an emission opening; a disc-like core member positioned at the inner end of the shell chamber, said core member and end wall having mating faces and said face of the core member having a swirl chamber formed therein in communication with

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the emission opening, and one of said mating faces being grooved for passage of liquid fuel past the mating faces to the swirl chamber; a retaining ring disposed in the shell chamber near the open end thereof; means preventing outward movement of said retaining ring; a clamping ring located in the shell chamber inwardly of the retaining ring; a domed filter having an annular flange positioned between the two rings; and a concavo-convex disc-like spring having flow passages therethrough positioned in the shell chamber between the clamping ring and the core member and bearing resiliently against both, whereby the clamping ring is urged towards the retaining ring to clamp the filter therebetween, and the core member is urged against the shell chamber end wall to insure against leakage of liquid fuel between the mating surfaces of said core member and end wall.

3. Structure as specified in claim 2, including means providing an abutment for supporting the retaining ring and for preventing outward movement thereof.

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