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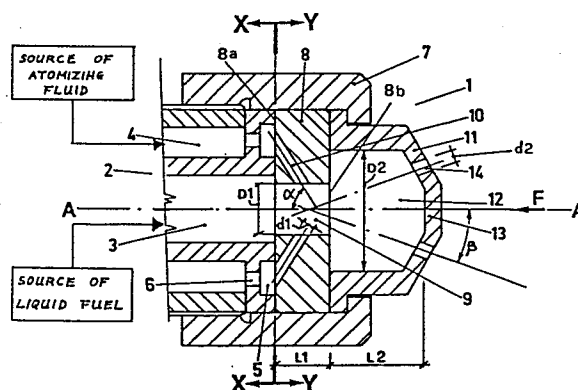
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Atomizer for a liquid fuel burner.

Atomizer (1) for a liquid fuel burner comprising a first mixer (8) for a fuel and an atomizing fluid which bears a central duct (9) for the fuel and a plurality of peripheral ducts (10) for the atomizing fluid which peripheral ducts (10) get to the central duct (9) obliquely or at right angle with respect to the central duct and comprising a second mixer (11) for the liquid fuel and the atomizing fluid already partly mixed one with the other which bears a mixing chamber (12) and a plurality of passages (14) for the delivery of the atomized fuel to a firebox (Fig. 1 is referred to).



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Atomizer for a liquid fuel burner.

The present invention relates to an atomizer for a liquid fuel burner.

Particularly, the invention relates to an atomizer suitable
5 to a burner for high viscosity liquid fuels or to two-phase mixtures such, for instance, coal-fuel oil or coal-water, having high viscosity and, in either case, by the assistance of air or steam as an atomizing fluid.

10 Atomizers for liquid fuels are known that are able to achieve an energetic exchange of energy between the fuel and the atomizing fluid, known as "y-jet" atomizers; atomizers of liquid fuels are known too that are able to achieve a modest exchange of energy between the fuel and the atomizing fluid,
15 known as "internal mixing" atomizers. The drawback of both the types of atomizer is that they are not suitable to atomize high viscosity liquid fuels.

The atomizer according to the present invention comprises a
20 first mixer for a fuel and an atomizing fluid which bears a central duct for the fuel and a plurality of peripheral ducts for the atomizing fluid which peripheral ducts get to

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the central duct obliquely or at right angle with respect to the latter and comprises a second mixer which bears a mixing chamber for the fuel and the atomizing fluid already partly mixed one with the other and a plurality of passages for the
5 delivery of the atomized fuel to a firebox.

More particularly, the peripheral ducts in the first mixer have their inlet in the front inlet surface and their outlet within the central duct in the mixer itself, the slope of
10 the peripheral ducts with respect to the axis of the central duct being within 35° and 90° ; the second mixer, urged on the central outlet surface of the first mixer, comprises a chamber facing the outlet of the central duct concentric with the latter, and a plurality of passages for the delivery
15 of the atomized fuel to a firebox, said passages being made in a wall opposite to said outlet, the axis of each passage being oblique with respect to the axis of the central duct by an angle within 20° and 60° .

20 The dimensions of the parts of the atomizer depend upon the characteristics of the fuel and of the atomizing fluid, upon the viscosity of the liquid fuel and type of atomizing fuel and said dimensions may be optimized by experimental methods.

25 The advantages of the invented atomizer reside in that the mixing by high exchange energy in the first mixer and the mixing by low exchange energy in the second mixer cause in a boiler firebox a fuel pencil so well atomized that the fuel burns permanently and the combustion efficiency is very high.

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One way of carrying out the invention is described in detail below with reference to drawings which illustrate only one specific embodiment, in which:

5 FIG. 1 is a side cross section view,
 FIG. 2 is a view according to X-X of FIG. 1,
 FIG. 3 is a view according to Y-Y of FIG. 1,
 FIG. 4 is a view according to F of FIG. 1.

10 The figure 1 shows an atomizer 1 mounted on the end of a device 2 comprising a duct 3 for the delivery of a liquid fuel and a duct 4 for the delivery of an atomizing fluid. The duct 4 communicates with a chamber 5 of the device 2 by passages 6. The atomizer 1 is urged on the device 2 by
15 means of the ring nut 7 screwed on a thread of the device 2.

The atomizer 1 comprises a first mixer 8 which bears a central duct 9 in communication and coaxial with the duct 3 and a plurality of peripheral ducts 10 the inlet of which
20 faces the chamber 5 and the outlet of which faces the inside of the central duct 9, the axis of each of the ducts 10 and the axis A-A of the central duct 9 forming an angle α of about 60° , and comprises a second mixer 11 which bears a chamber 12, the aperture of which faces concentrically the
25 central duct 9, and a wall 13 bearing a plurality of passages 14, the axis of each passage 14 and the axis A-A of the central duct 9 forming an angle β of about 20° .

The figure 2 shows the front end of the device 2 together with
30 the chamber 5, passages 6, ring nut 7 and duct 3.

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The figure 3 shows the front of the first mixer 8 together with the central duct 9, ring nut 7, and the plurality of peripheral ducts 10.

- 5 The figure 4 shows the front of the atomizer 1 together with the second mixer 11, ring nut 7 and the plurality of passages 14 in the wall 13.

- 10 The figure 1 also shows some references to the dimensions of the different parts: so, the diameter D1 of the central duct 9 is about 11 mm, diameter d1 of the peripheral ducts 10 is about 3,5 mm, length L1 of the central duct 9 is about 14 mm, diameter D2 of chamber 12 is about 20 mm, length L2 of chamber 12 is about 30 mm, diameter d2 of
15 passages 14 is about 4 mm and the length thereof is about 6 mm.

- The illustrated atomizer is suitable to a coal-water fuel pumped through the duct 3 under the pressure of about 9 Kg/sq.
20 cm and to air as atomizing fluid pumped through the duct 4 under a pressure of about 11 Kg/sq.cm.

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Claims:

1. Atomizer for a high viscosity liquid fuel burner characterised in that it comprises a first mixer (8) for the fuel and the atomizing fluid which bears a central duct (9) for the fuel and a plurality of peripheral ducts (10) for the atomizing fluid which peripheral ducts (10) get to the central duct (9) obliquely or at right angle with respect to the central duct and comprises a second mixer (11) which bears a mixing chamber (12) for the fuel and the atomizing fluid already partly mixed one with the other and a plurality of passages (14) for the delivery of the atomized fuel to a firebox.

2. Atomizer as claimed in claim 1 characterised in that the peripheral ducts (10) in the first mixer (8) have their inlet on the front inlet surface (8a) and have their outlet into the central duct (9), the slope of the peripheral ducts (10) with respect to the axis (A-A) of the central duct (9) being within 35° and 90° and in that the second mixer (11) bears a chamber (12) facing the outlet (8b) of said central duct, concentric with the latter, and a plurality of passages (14) for the delivery of the atomized fuel to a firebox, said passages (14) being made in a wall (13) opposite to said outlet (8b), the axis of each passage being oblique with respect to the axis (A-A) of the central duct (9) by an angle within 20° and 60° .

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