

Title (en)
ULTRASONIC ATOMISER FOR LIQUID FUELS

Publication
EP 0021194 A3 19810520 (DE)

Application
EP 80103161 A 19800609

Priority
US 4664179 A 19790608

Abstract (en)
[origin: EP0021194A2] 1. Ultrasonic atomizer for producing a finely atomized stream of extremely fine liquid particles, comprising a driving means whose output plane provides a longitudinal vibratory displacement at a predetermined ultrasonic operating frequency, comprising a vibration amplifying means in the form of a stepped ultrasonic horn with a first cylindrical portion (34) whose input end plane is coincident with the output plane of the driving means (33) and whose length is equal to a quarter wavelength at the operating frequency, further comprising a second cylindrical portion (35) adjoining the other end of the first cylindrical portion, with a diameter substantially smaller than that of the first cylindrical portion (34) and with a flanged tip (36) adjoining the outer end of the second cylindrical portion, the diameter of the flange being substantially greater than the diameter of the second, but less than the diameter of the first cylindrical portion, and the outer face of the flanged tip forming an atomizing surface, further comprising means for delivering a liquid flowing radially outwardly at the atomizing surface for atomization by the vibrations produced by the driving means, characterized in that the atomizing surface (29) has a convexly conical surface extending in accordance with the edge of the flanged tip and therefore producing a substantially cone-shaped spray dispersion of finely distributed droplets flowing over this surface when the atomizer is excited by the operating frequency, with the axis of this cone-shaped flow extending parallel to the direction of the longitudinal vibration, and the apex angle of the convexly conical surface forming the supplementary angle for the conical flow angle of the atomized liquid ; in that, furthermore, the flanged tip comprises a short cylindrical portion (38) contiguous to the atomizing surface, with the same diameter as the base of the conical atomizing surface, and therefore ensures that the atomizing surface effects only longitudinal vibrations ; and in that the dimensions of the stepped ultrasonic horn correspond to the dimensions resulting from the solving of the time-invariant differential equation for the propagation of longitudinal vibrations in a solid medium operated at the preselected ultrasonic frequency.

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