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ATOMIZER FOR LIQUIDS

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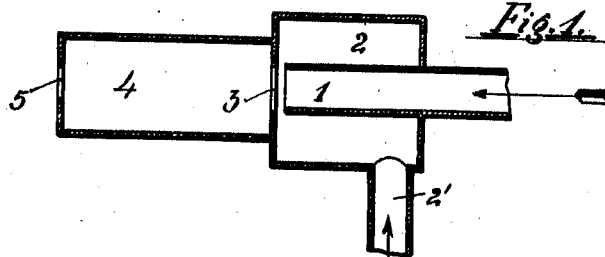


Fig. 1.

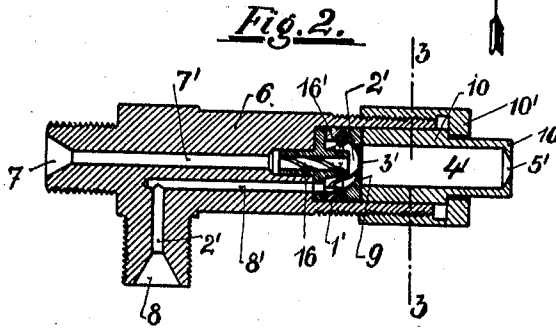


Fig. 2.

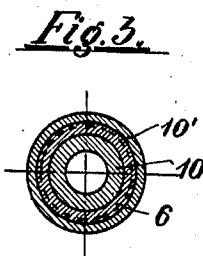


Fig. 3.

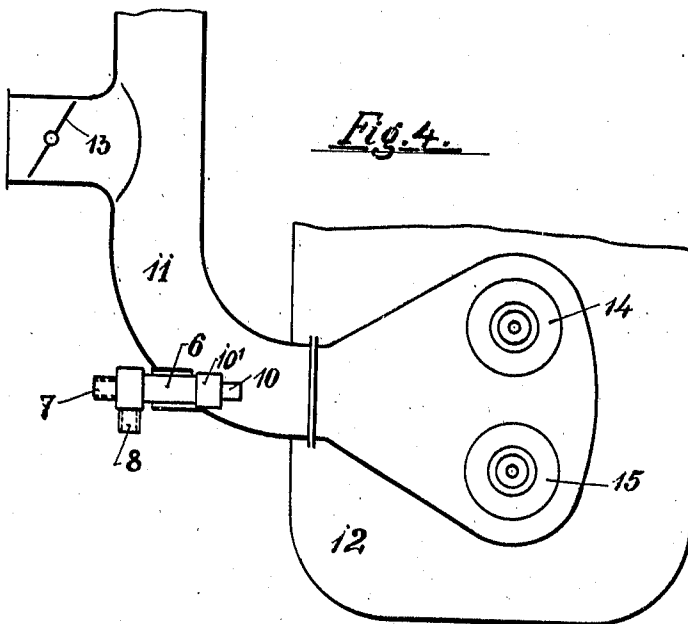


Fig. 4.

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ATOMIZER FOR LIQUIDS.

Application filed September 9, 1924, Serial No. 736,713, and in Germany September 13, 1923.

This invention relates to a device for atomizing liquids, and particularly heavy oils, by a gas jet. The jet is conducted into a chamber containing the liquid to be atomized by a nozzle and an opening is made in the wall of said chamber which faces said nozzle, the opening being a short distance apart from, and concentric with, said nozzle. The gas jet issuing from said nozzle breaks up and partly atomizes the liquid, by subdividing it into extremely fine globules at the edge of the opening in said wall. It is not always possible to obtain complete atomization in one stage so that the mixture issuing from said opening will often contain comparatively large globules of unbroken liquid mixed with the fine globules. In order to completely atomize all the liquid, the mixture is subjected to further atomization in a second, third etc. stage until the desired degree of fineness has been attained. The atomization in the second and the following stages—if any—is effected in chambers resembling the chamber of the first stage.

It will be understood that the number of atomizing stages and the size and arrangement of openings in their front walls are determined by the condition of the liquid to be atomized, the gas pressure and other factors.

In the drawings, devices embodying the invention are illustrated by way of example. Fig. 1 is a diagrammatical longitudinal section of a two-stage atomizer.

Fig. 2 is a longitudinal section of a two stage atomizer as constructed in practice,

Fig. 3 is a cross section on line 3—3 of Fig. 2, and

Fig. 4 illustrates the arrangement of an atomizer at the suction manifold of an engine.

Referring now to Fig. 1, the atomizer comprises a chamber 2 to which gas is admitted by a nozzle 1 and liquid by a pipe 2, as indicated by the arrows. In the front wall of the chamber which is facing the nozzle 1, an opening 3 is provided co-axial with the nozzle 1.

Motion is imparted to the liquid in chamber 2 by the jet issuing from the nozzle 1 and the mixture of gas and liquid is moved past the edge of the perforation 3 at high velocity and atomized.

As the atomization in the first stage will, as a rule, not be quite satisfactory, a second atomization stage is provided by connecting a second chamber 4 with the first chamber 2 the front end wall of the second chamber be-

ing perforated at 5, the perforations 3 and 5 being co-axial with the nozzle 1. As mentioned, any number of further chambers and perforations may be provided and the perforations may be arranged co-axial with the nozzle 1 or grouped as desired. For an efficient operation of the atomizer it is essential that the openings 3 and 5 shall, by means of the edges, have a tearing tendency on the fluid particles, and such openings are therefore made in thin plates, so that the drops of oil will strike against the sharpest possible edges.

In the atomizer shown in Fig. 2, gas is admitted to the body 6 of the atomizer at 7, and liquid at 8. The gas is conducted to a nozzle 1' through a passage 7', and the liquid is conducted to a chamber 21 surrounding the end of the nozzle through a passage 8'. The chamber 21 is closed by a cap 9 the thin front end wall of which is perforated at 3'. The perforation is co-axial with the nozzle 1'. The second stage is formed by a chamber 4' in the shape of a sleeve 10 held on the cap 9 by means of a nut 10' and provided with an opening 5' at its front end.

The mixture of gas and liquid formed in the chamber 21 is discharged through the perforation 3' of the first stage and conducted to the second stage at the end of the chamber 4'. A third chamber may be connected with the chamber 10, and so forth, until the desired fineness of atomization has been attained.

The nozzle or the chamber, or both, may be provided with helical grooves or projections as indicated at 16 and 16', so that a whirling motion is imparted to the mixture.

Fig. 4 illustrates the arrangement of the atomizer at the suction manifold 11 of an engine provided with the inlet valves 14 and 15 at the top of the cylinder 12. 13 is the throttle.

With the improved atomizer, liquids are atomized very finely and completely at a minimum gas consumption. Variations of the gas and liquid pressures are without influence on the efficiency of the atomizer within very wide limits.

I claim:

A device for atomizing heavy oils comprising a body portion having a gas inlet and an oil inlet; a nozzle in said body portion and arranged in said gas inlet, said nozzle having helical grooves therein to impart a rotary motion to the gas; a mixing chamber for the

oil and gas in the body portion and provided with an opening having sharp edges for atomizing the drops of oil, said nozzle extending into said chamber and said edges being
5 opposite the end of the nozzle; a second chamber into which the oil and gas issues from the first-named chamber, said second chamber being provided with a member having a passage terminating in a sharp edge to form an opening in order to further atomize
1 the drops of oil, and said openings being in axial alignment; and means for securing said second chamber in the body portion.

In testimony whereof we have affixed our signatures.

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