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O. KAY

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ATOMIZER

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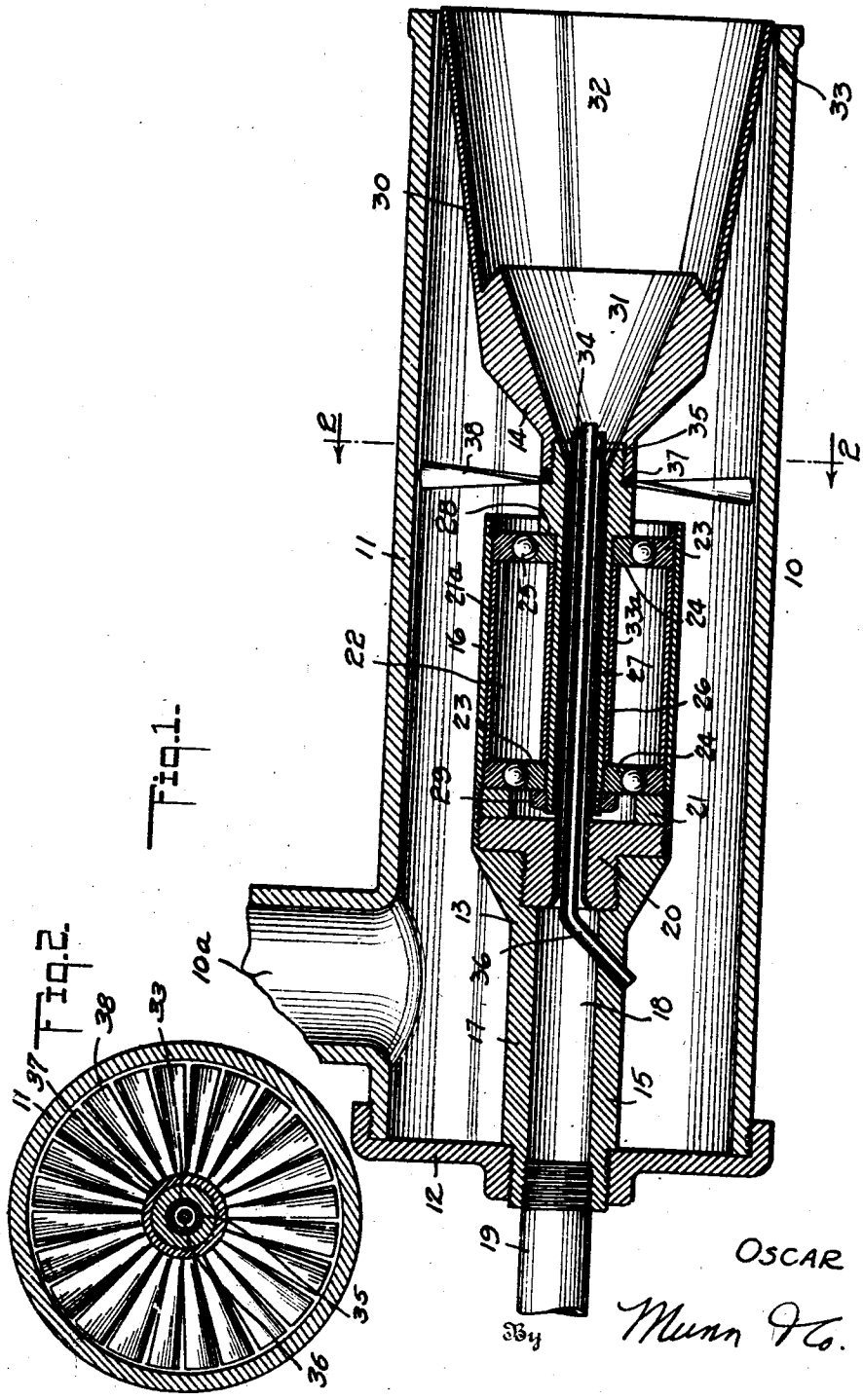


Fig. 1.

Fig. 2.

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ATOMIZER

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My invention relates to and has for a purpose the provision of a simple, durable and compact atomizer particularly adapted, although not necessarily, for use in the atomizing of liquid fuels such as crude oil or other hydrocarbons, and by which a thorough atomizing of the fuel and intimate mixing thereof with air will be effected, and the mixture ejected from the atomizer at a high velocity, to the end that a highly combustible mixture will be obtained, which when burned will produce a practically complete combustion.

Other objects and advantages will become apparent as the description proceeds.

In the accompanying drawings,

Figure 1 is a vertical longitudinal section through the atomizer;

Figure 2 is a section on line 2—2 of Figure 1.

In order to effect disintegration of the oil through an atomizing process, use is made of an atomizer 10 including a housing 11 closed at one end by a cap 12, and provided at one side preferably adjacent to said cap with an inlet opening 10^a in order that air under suitable pressure may be introduced to said housing. Located within the housing is a nozzle 13 comprising a rotary section 14 and a stationary section 15. The stationary section 15 is formed with a cylindrical enlargement 16 and a reduced branch 17, in which latter is formed a bore 18. The branch 17 is threaded into the head 12 axially thereof, and same finds connection with an oil supply pipe 19. Threadedly fitted within the section 15 of the nozzle is a plug 20 which is associated with a lock nut 21. At the opposite end, the section 15 is provided with a stop sleeve 21^a and between said sleeve and said nut 21 is a barrel 22 carrying race members 23—23 which coact with similar race members 24—24 to accommodate anti-friction bodies 25. The members 24—24 are spaced apart by a sleeve 26 and, as illustrated, said members are mounted on the hollow tube 27 of the revolving section of said nozzle 13. The forward end of the tube 27 is shouldered at 28 and the rear end threaded to receive a clamp nut 29, whereby the members 24—24 are held fast to the tube 27.

Screwed or otherwise suitably secured to the revolving section 14 of the nozzle is an impact member 30 comprising integral, respectively graduated, frusto-conical cones 31 and 32, the largest diameter of the cone 32 being slightly less than the internal diameter of the forward end of the aforementioned housing 11 so that an annular space 33 is formed therebetween.

Within the cylinder 16 axially of the tube 27 is a jet pipe 33^a closed at its forward end at 34 and provided just rearward of said forward end with a radial orifice 35 which opens toward the extreme inner or reduced end of the cone 31. The rear end of the jet pipe opens to the bore 18 which leads to the source of fuel supply.

Extending through the tube 27 in spaced relation to the walls thereof is an air tube 36 whose forward end extends beyond the closed end 34 of the tube 27, and whose rear end extends into the housing 11 where it opens thereto. Mounted on the revolving section 14 of the nozzle 13 is an impeller 37 having radial blades 38.

The forward or enlarged end of the cone 31 is arranged in overlapped relation to the walls of the cone 32 at the small end of the latter.

Cold decomposition

I have described the characterizing instrumentalities of means or mechanism for effecting decomposition of petroleum with the consequent breaking up of the molecules and the production of both lighter and heavier hydrocarbons, called "cracking" and the manner of functioning of the parts is set forth as follows:

Crude petroleum under pressure is admitted to the nozzle 13. Air under suitable pressure is admitted to the housing 11 by way of the intake opening 10^a. The petroleum is fed through the jet tube 27 where it finds escape by way of the orifice 35. From said orifice, the petroleum is forced against the impact surface of the small end of the cone 31. During the operation of continuously feeding the petroleum through the nozzle, the

function of the respective cones 31 and 32 is to set up rotation of the petroleum within said cones or to impart thereto a whirling motion. This causes a bombardment of the petroleum against the entire inner wall surfaces of said cones to the end that the molecules are thoroughly broken up. The overlapped relation of the respective cones serves to further augment the decomposing action as the fluid leaves the small cone and enters the large one. As the parts function in the manner aforementioned, air under pressure from the tube 36 and the opening 10^a is drawn into the small end of the cone 31 where it emerges axially thereof from in front of the closed end 34 of the jet pipe 33. I find that the air mixing with the elements within the cones 31 and 32 additionally lends to the effect of the cones toward rapid decomposition of the elements.

Incident to the fact that air under pressure is constantly entering the housing 11, it manifestly follows that this air acts to drive the impeller 37 to effect rotation of the nozzle portion 14 and its cones 31 and 32. Blast induced at the space between the large end of the cone 32 and the forward end of the housing 11 assists the decomposing action.

Due to the fact that the initial discharge of the petroleum is in a radial direction at the inner end of the cone 31, the impact action herein referred to is progressively augmented so that when the elements reach the large discharge end of the cone 32 a complete cracking of the oil has been effected and by the action of the air from opening 10^a supplemented by the prevailing effect of air issuing from the pipe 36, the decomposed petroleum is expelled spray-like from said cone.

Although I have herein shown and described only one form of atomizer embodying my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit of the invention and the spirit and scope of the appended claim.

I claim as my invention:

An atomizer comprising an elongated cylindrical housing open at one end and closed at its other, the housing having an air inlet adjacent its closed end, a nozzle in the housing comprising a tubular stationary section having a reduced portion secured axially to the closed end of the housing and an enlarged cylindrical portion, a plug threaded into the cylindrical portion, the nozzle including a rotatable section comprising a barrel rotatably mounted axially in the cylindrical portion of the stationary section, an impact member comprising a plurality of frusto-conical elements of graduated diameters secured to the forward end of the barrel, the larger end of the largest element being slightly smaller than the internal diameter of the housing so as to provide an annular air passage between the two, an impeller secured to the rotatable section between the forward end of the stationary section and the smallest frusto-conical element and operating to rotate the rotatable section in response to air under pressure admitted to the housing through its inlet, a fuel tube axially of and in spaced relation to the barrel, the forward end of the tube being closed and extending into the rearmost frusto-conical element, a radial port in the tube adjacent its forward end, the rear end of the tube being secured in said plug and communicating with the interior of the reduced portion of the stationary section so that fuel under pressure admitted to the latter will be discharged through said port radially against the smallest element, and an open-ended air tube axially of and in spaced relation to the fuel tube, the rear end of the air tube being angularly disposed and projecting through the wall of the reduced portion of the stationary section, for communication with the interior of the housing, the forward end of the air tube projecting through the closed end of the fuel tube into the frusto-conical elements so that air from the housing will be delivered axially into the elements.

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