Feb. 12, 1952 C. T. YOUNG 2,585,205

LIQUID FUEL INJECTOR

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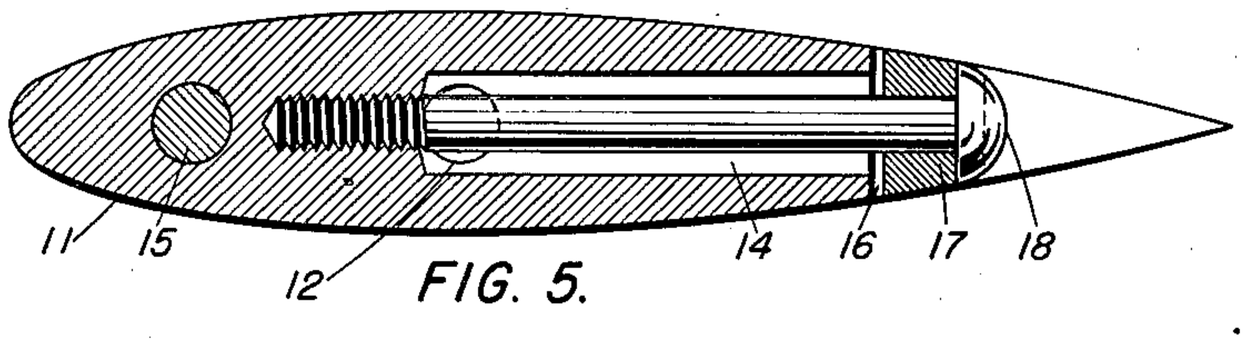


FIG. 5.

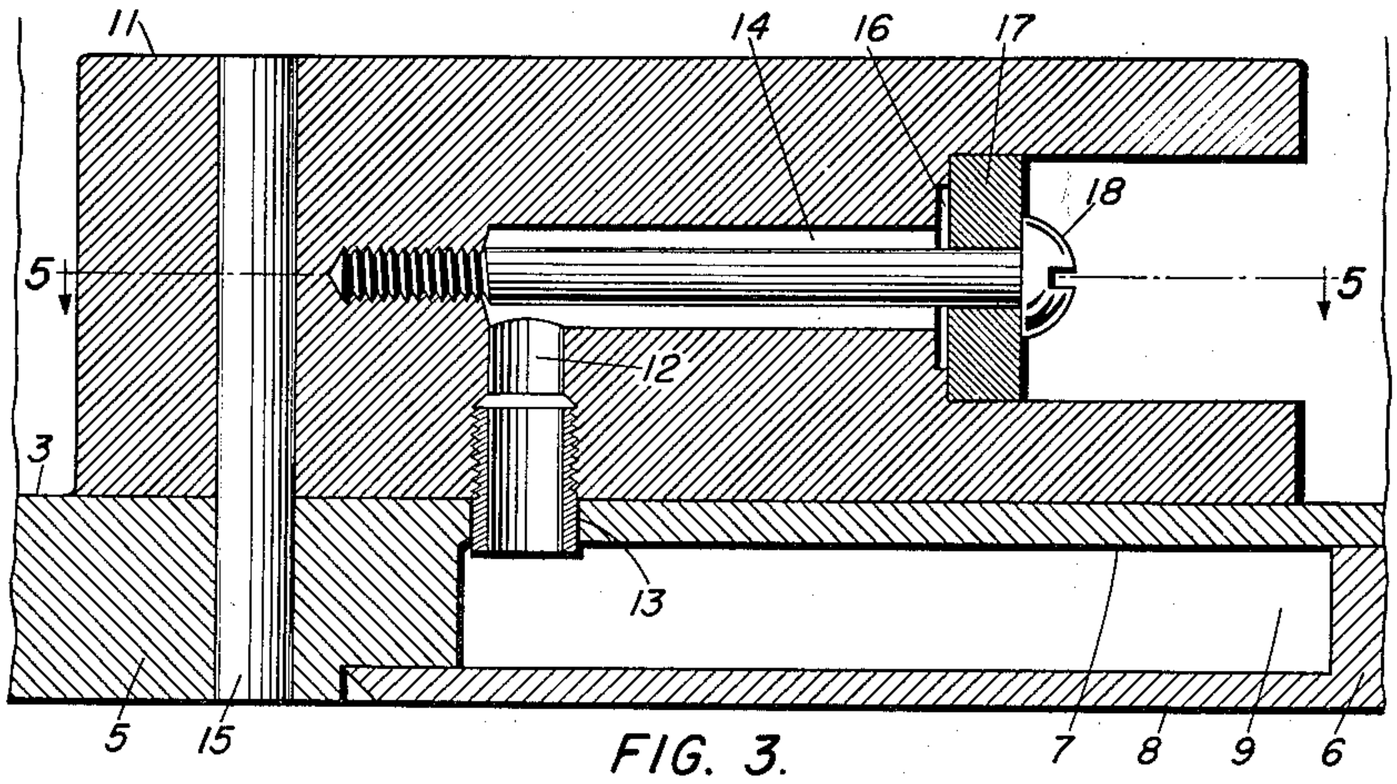


FIG. 3.

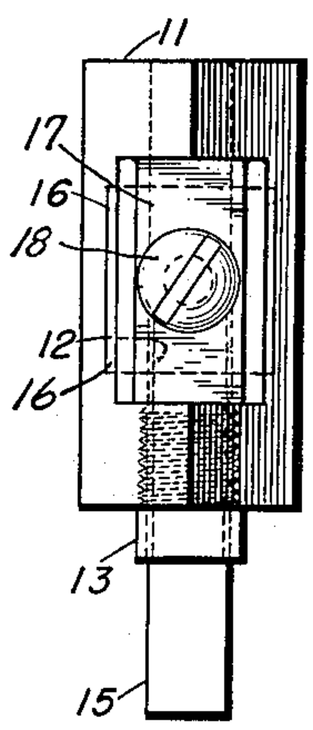
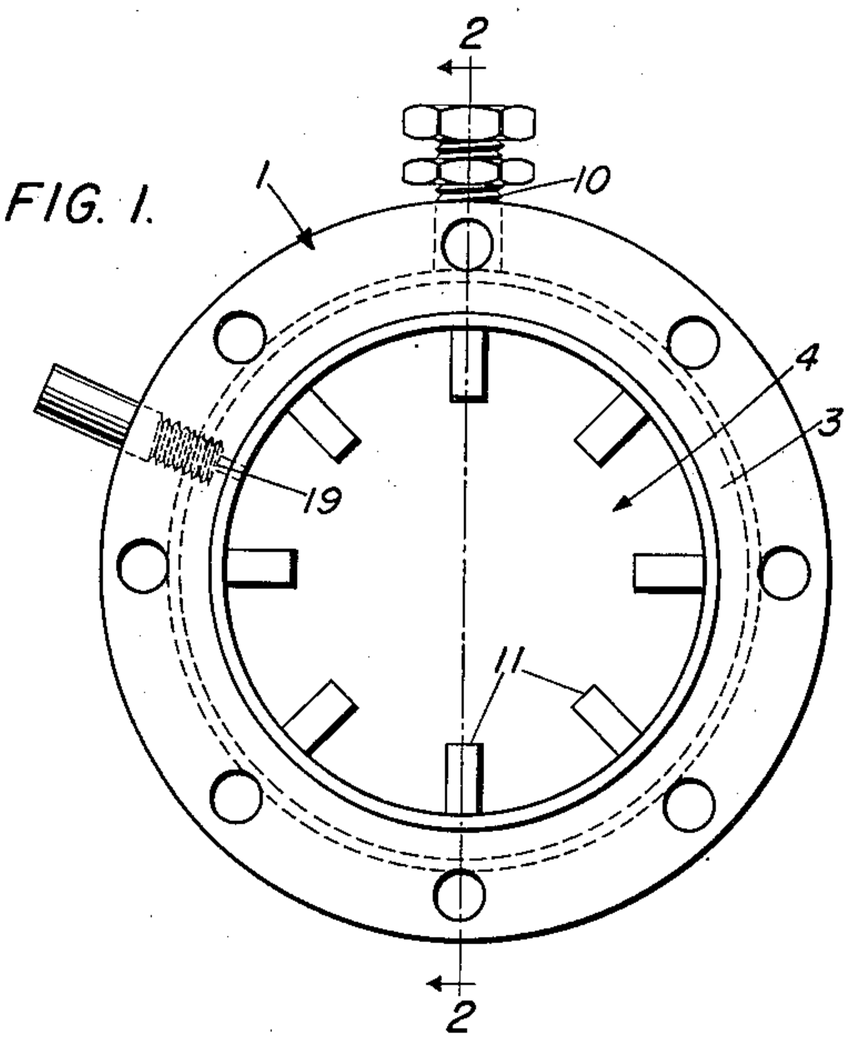


FIG. 4.

FIG. 1.



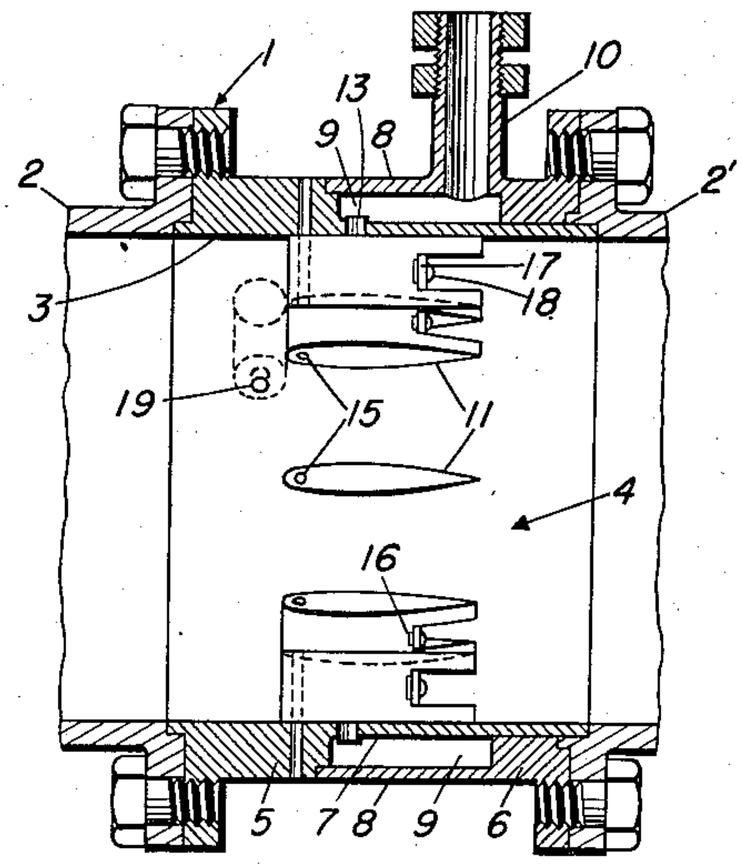


FIG. 2.

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LIQUID FUEL INJECTOR

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4 Claims. (Cl. 261—76)

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This invention relates to improvements in jet propulsion motors and is particularly directed to an improved liquid fuel injector designed to be used as an atomizer for the formation of a continuous fuel charge, which charge or fuel mixture is created in a constant stream under pressure of fuel air.

The principal object of the present invention is to provide a jet propulsion motor with a liquid fuel motor designed to eject the liquid fuel in a thin, wide sheet of film of such consistency that a passing current or stream of fuel air will readily combine with and convert the atomized liquid into an effective fuel mixture prior to admission into the combustion chamber of the motor.

A further object of the present invention is to provide a jet motor with a group or series of injectors mounted in the fuel mixing chamber, or feed duct, in order that the finely atomized liquid fuel may be uniformly distributed over a wide area for thorough commingling with the fuel air flowing under pressure through the mixing chamber.

A still further object of the invention is to provide an atomizer for use in a jet motor of simple and rugged construction, which may be readily manufactured in large quantities and easily installed; whose operation can constantly be relied upon, and which is both durable and effective in use.

Still further objects, advantages, and improvements will be evident from the following description of the invention taken in connection with the accompanying drawings in which:

Fig. 1 is an end view of a device embodying the present invention.

Fig. 2 is a longitudinal section thereof taken along 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view showing in detail a portion of the full distribution chamber and the relation thereto of one of the injectors.

Fig. 4 is an end view of an injector element, and

Fig. 5 is a sectional view taken along 5—5 in Fig. 3.

Referring now to the drawings on which like numerals of reference are employed to designate like parts throughout the several views, and more particularly to Figs. 1 and 2 thereof, there is shown a portion of an improved jet motor indicated by the numeral 1 consisting of a pair of cylindrical members 2, 2' secured to the respective ends of a sleeve 3 to form a mixing chamber 4. The sleeve 3 is constructed in two sections 5 and 6, said sections having oppositely recessed wall portions 7 and 8 respectively, said recessed wall portions being designed to overlap to form an annular fuel chamber 9. A fuel supply pipe 10 is connected to the wall 8 and communicates with the fuel chamber 9.

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On the inside wall of the section 5 there is a plurality of fuel injectors or atomizers 11 symmetrically mounted. As can be noted, the injectors 11 are streamlined in shape so as to offer a minimum of resistance to the flow of air, and each is secured to the wall 7 by a respective stud or post 15 and by being welded thereto.

Each of the injectors 11 is bifurcated at its tapered end, and has an inlet port in the form of a transverse duct 12 threaded at one end to receive a nipple 13 which connects the annular chamber 9 with a longitudinally disposed outlet port or discharge duct 14. The discharge or atomizing effect of the liquid fuel is caused by a narrow slot 16 having a baffle plate 17 secured at the mouth of the duct 14 by a bolt 18 which extends through the duct 14 and is threaded into the body of the injector 11. The discharged liquid fuel forms two lateral sprays, mixing with the air as it flows through the mixing chamber 4 and into the combustion chamber (not shown). A tapped port 19 provides a source of fluid pressure taken from the forward portion of the mixing chamber for auxiliary purposes.

In the operation of the jet motor 1 that includes the present device, the fuel, introduced under pressure, through pipe 10, into the annular chamber 9, is discharged into the mixing chamber 4, from both ends of the narrow slot 16 formed between a rear surface of the injector 11 and the adjacent front surface of the baffle 17. This structure directs the flow of fuel into two thin sheets, flowing in opposite directions and substantially at right angles to the length of the injector. However, at its point of exit from the slot, each sheet of liquid fuel meets the high velocity air stream, normally flowing through the jet motor, tangentially to the outer surface of the injector, and thereby is sharply deflected to the rear and simultaneously atomized and mixed with said air. The mixture of fuel and air then flows into the combustion chamber, where it is ignited and burned to energize the jet motor.

While the invention has been described with reference to a certain preferred example thereof which gives satisfactory results, it will be understood by those skilled in the art to which the invention pertains, after understanding the in-

vention, that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended, therefore, to cover in the appended claims all such changes and modifications.

What is claimed is:

1. A streamlined liquid fuel injector, bifurcated at its rear end, there being a fuel duct within said injector, opening between the furcations thereof to form an outlet port for the fuel, said injector having a transverse slot in communication with said port and forming continuations of said fuel duct, a baffle plate mounted over said slot to form therewith a pair of oppositely opening fuel discharge ports, and means for securing said baffle plate to said injector.

2. In a jet motor, a tubular member, constituting a mixing chamber, said tubular member having a fuel container within its wall, a fuel inlet pipe affording a connection to said container from outside the member, and a plurality of elongated fuel injectors secured to the inside wall of said member, and each extending in the direction of the longitudinal axis of the motor, each injector having a fuel passage connecting it to the container, each such passage terminating in a narrow slot directed transversely of the injector and open at both ends to discharge fuel at the outer surface of the injector, within said mixing chamber.

3. In a jet motor, a mixing chamber comprising a first tubular member having a recessed wall portion extending therefrom, a second tubular member having an extending wall portion recessed oppositely to the wall portion of said first tubular member, said first and second tubular members being assembled coaxially whereby said oppositely recessed wall portions overlap to form an annular fuel duct, a plurality of elongated injectors mounted within said assembled tubular members with their longitudinal axes parallel to the axis of said tubular members, each of said

elongated injectors comprising a longitudinally streamlined body member having a bifurcated end, there being a conduit in each body member communicating with the fuel duct and terminating between the furcations to form an outlet port at said bifurcated end, each said body member having a transverse slot adjacent said outlet port, and a baffle plate mounted on each said body member to cover said outlet port and form with said slot a pair of oppositely and laterally directed ports.

4. In a jet motor, a mixing chamber comprising a first tubular member having integral therewith a longitudinally extending recessed wall portion, a second tubular member having integral therewith a longitudinally extending wall portion recessed oppositely to the wall of said first tubular member, said first and second tubular members being assembled coaxially, whereby said oppositely recessed wall portions overlap longitudinally and concentrically to form an annular fuel duct, a plurality of elongated injectors mounted within said assembled tubular members with their longitudinal axes parallel to the common axis of said tubular members, and conduit means connecting said injectors to said annular duct.

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