Oct. 7, 1930. R. E. TALLEY 1,777,337

OIL BURNER

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Fig. 1.

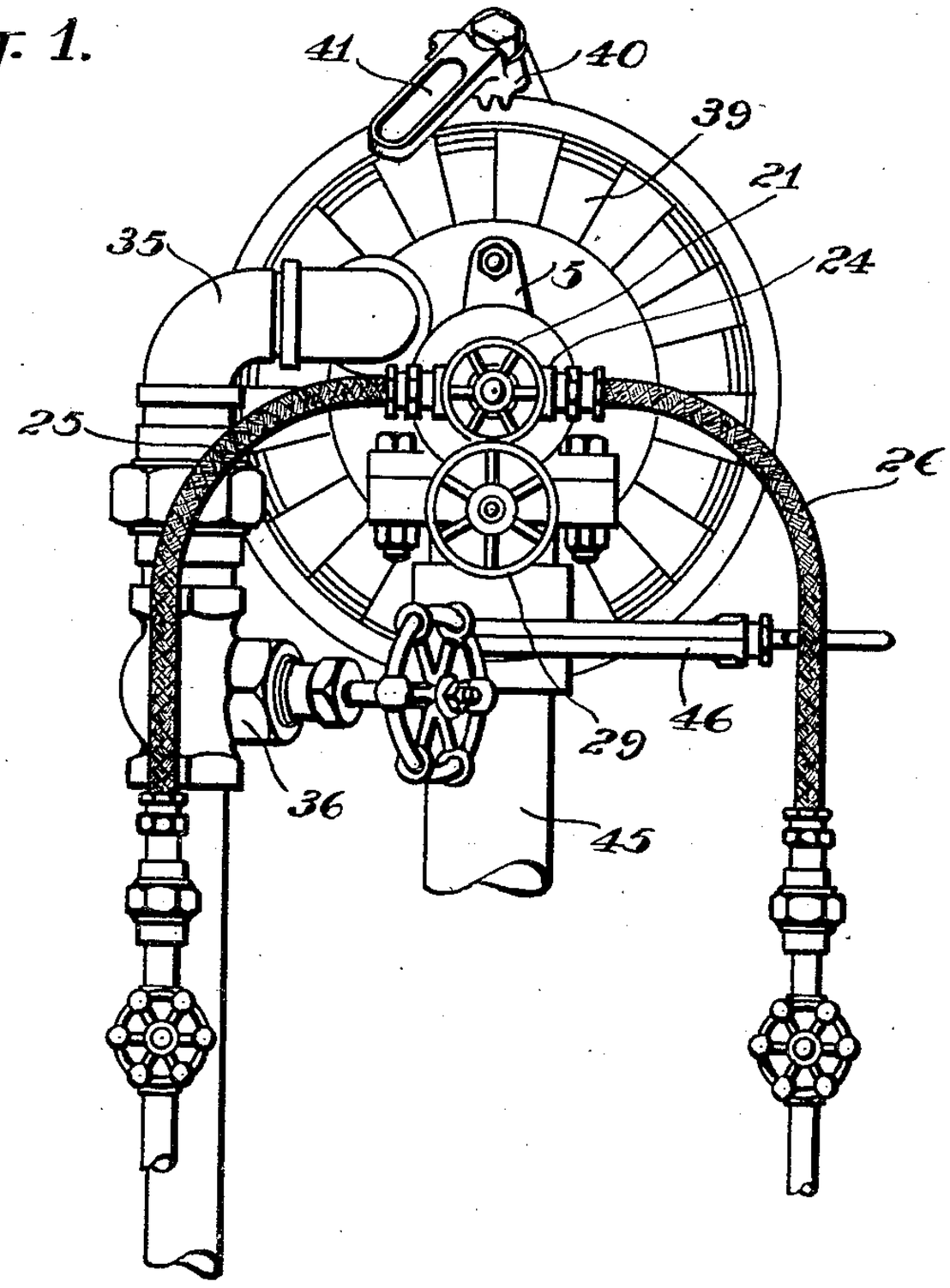

Fig. 4.

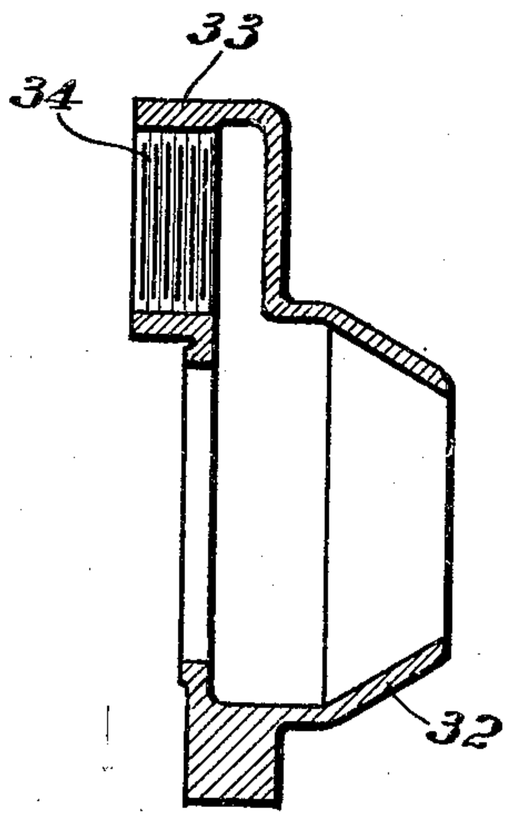

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Fig. 3.

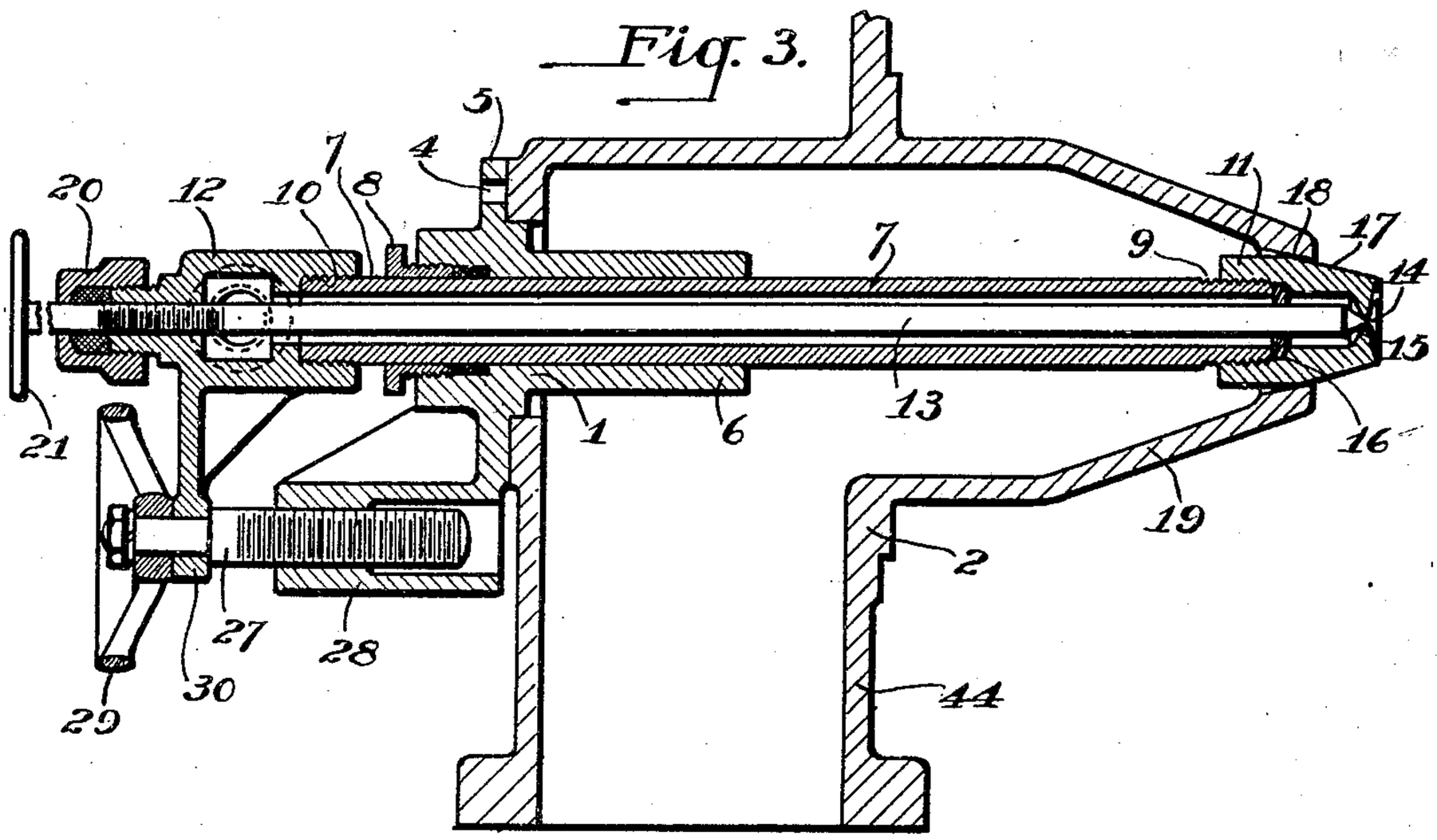
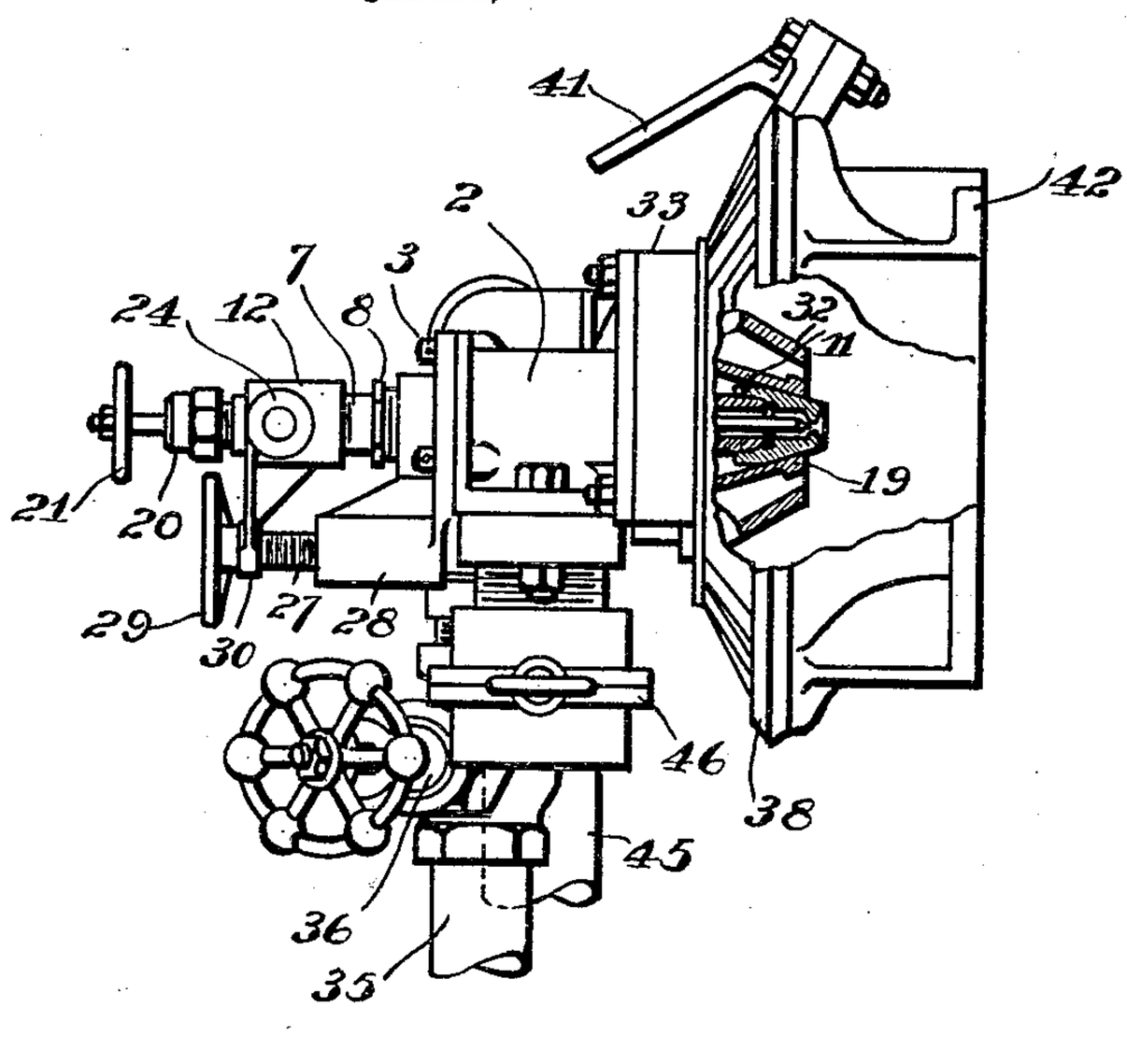


Fig. 2.



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UNITED STATES PATENT OFFICE

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OIL BURNER

Application filed June 9, 1927. Serial No. 197,543.

This invention relates to liquid fuel burners for industrial heating, more particularly to improvements in combination oil and gas burners.

It is among the objects of the invention to provide a burner of simple and durable mechanical construction comprising a minimum number of operating parts and which is particularly designed to eliminate packing glands and other joints which commonly cause trouble by leakage in the operation of burners heretofore constructed.

Another object of the invention is to provide a burner in which the fuel nozzle and particularly its needle valve is close to the point of meeting of the air whereby maximum atomizing efficiency is obtained and in which the burner-tip or throat of the burner from which the combustible mixture enters the furnace is designed to allow for the proper induction of air whereby the power required to deliver air for combustion is materially reduced.

Another object of the invention is to provide a control for the atomizing air valve by means of which micrometric adjustments of the air valve may be secured to the burner tip without restricting the pressure of the air or its velocity.

Another object of the invention is to provide a burner in which the fuel nozzle and air nozzle are independently adjustable to regulate the flow of fuel and air and in which the nozzles shall be adapted for relative adjustment to change the point of atomization in accordance with the available air pressure and velocity.

Still another object of the invention is to provide a burner of the above designated character in which the oil is circulated through the burner head whereby the chilling of oil in the supply line leading to the head is eliminated whether the burner is in operation or not.

In the accompanying drawings constituting a part hereof and in which like reference characters designate like parts, Fig. 1 is an end elevation of a combined liquid fuel and gas burner embodying the principles of this invention; Fig. 2 is a side elevational view thereof partially in section illustrating the general arrangement of parts and the oil, air and gas nozzles; Fig. 3 is a longitudinal sectional elevation of the oil nozzle and burner tip and the regulating mechanism therefor; and Fig. 4 is a cross sectional view of the gas nozzle shown in Fig. 2.

Referring to Fig. 3 of the drawings the structure therein illustrated comprises a bracket 1 rigidly secured to a burner body 2 by screws or bolts 3 which are disposed through openings 4 in the flange or spider portion 5 thereof. The bracket 1 is provided with an extending sleeve portion having a central opening adapted to receive an oil tube 7 which is accurately fitted for sliding axial movement therein, the tube and head being sealed against leakage of pressure from the inside of the burner by a gland 8.

The oil tube 7 is provided with threaded portions 9 and 10 on the respective ends thereof which are in screw engagement with a burner tip 11 and an oil head 12 respectively. A needle valve 13 is disposed within the tube 7 and projects through the head 12 at one end and the burner tip 11 at the other end. The end of the valve 13 is adapted to project into a relatively small orifice 14 provided with a valve seat 15 for the tip. A spider 16 is disposed in the burner tip 11 and is secured in a countersunk portion thereof as shown by the end of the oil tube 7 for bracing the needle valve stem. The burner tip 11 is of frustro-conical shape, the tapered body portion 17 of which cooperates with an air nozzle 19 to constitute an air valve. The outside conical surface 17 of burner tip 11 is provided with fluted slots (not shown) to allow passage of a small amount of air from air nozzle 19 for the purpose of cooling the burner tip. It frequently happens that a furnace is operating at full temperature with some of its burners shut down, and the fluted slots in the burner tip prevent injury to the shut-down burners from hot gases escaping from the burner openings.

A packing gland 20 is secured to the oil head 12 for the valve stem 13 and one end of the latter is provided with a hand wheel 21 by means of which the tip of the needle

valve may be manually adjusted relative to its seat 15. As shown in Fig. 2 the oil head 12 is provided with projecting trunnion shaped bosses 24 to provide connections for a pair of flexible conduits 25 and 26, Fig. 1, which constitute the oil supply and return connections for the burner head. Again referring to Fig. 3 of the drawings, the oil head 12 together with its connected oil tube 7 are axially movable in the member 1 by means of a screw and nut mechanism 27 and 28, the latter comprising a boss formed integrally with the member 1. A hand wheel 29 is secured to the end of the screw 27 and the latter is disposed through an opening in a downwardly projecting lug portion 30 of the oil head 12 so that when the wheel 29 is rotated to turn the screw 27 in the threaded portion of the member 28 the oil head 12 and its associated tube 7 and burner tip 11 will be moved as a unit in the burner head. The purpose of such movement is to secure micro-metric adjustments of the burner tip relative to its seat 18 in the air nozzle 19.

Referring to Figs. 2 and 4, a gas nozzle 32, Fig. 4, is disposed around the air nozzle 19 and secured in the burner body as shown in Fig. 2. The nozzle 32 is provided with an off-set portion 33 having a threaded opening 34 for receiving a gas line connection 35 shown in Fig. 1 which is provided with a valve 36 for regulating the gas supply to the burner head. The burner is also provided with an adjustable register 38 which comprises a stationary member and a movable plate both of which are provided with perforations or openings 39 which may be angularly adjusted by a gear segment 40. The register may be regulated to provide any suitable size of opening depending upon the volume of induced air it is desired to admit to the burner. The gear segment 40 is actuated by a hand lever 41 to effect the adjustment of the register. The end of the burner body is provided with footings 42 by means of which the burner is attached to the furnace.

Referring to the member 19 in Fig. 3, the lower portion thereof is provided with a flanged sleeve portion 44 by means of which the air nozzle is connected to a pipe line 45, Figs. 1 and 2, leading to an air blast. A blast gate 46 may be interposed in the air line to regulate the volume of air delivered to the air nozzle 19.

The operation of the combined oil and gas burner is briefly as follows:

The oil is delivered to the burner head under pressure through the side openings in the oil head 12 by the flexible conduit 25. The amount of oil delivered at the burner tip is regulated by adjustment of the hand wheel 21 which regulates the openings at the needle valve seat. The excess oil delivered to the burner and not being used by that burner passes on through flexible hose 26 to the pipe line and thence to source of supply. When the oil flow has been adjusted the hand wheel 29 is rotated in a direction to draw the oil tip 11 from its seat 18 of the air nozzle to permit the desired flow of air from the air blast through the nozzle 19. The volume of air is regulated to obtain suitable atomizing efficiency at the burner tip and for this purpose the particular arrangement of the adjusting mechanism 27—28 is provided, which permits micrometric adjustment of the tip 11 in the air nozzle 19. By these fine adjustments, efficient atomization of the fuel can be obtained when the burner is operating at very low air pressure. When the air has been adjusted for atomization, the register 38 may be regulated by manipulating the lever 41 to obtain the desired amount of induced air for controlling and regulating the flame projecting from the burner tip to meet the particular requirements of the furnace.

If it is desired to utilize gas in conjunction with the oil burner, the valve 36 is regulated to produce the desired flow of gas at the tip of the nozzle 32. It is, of course, obvious that gas fuel may be employed independently of the oil burner for which purpose the air blast and register may be utilized in the manner heretofore described.

It is evident from the foregoing description of this invention that combination oil and gas burners made in accordance therewith provide simple and efficient means for securing maximum atomizing efficiency in the consumption of oil fuel and to obtain the proper induction of air in the furnace.

Although one of the embodiments of the invention has been herein illustrated and described, it will be obvious to those skilled in the art that various modifications may be made in the details of construction and in the arrangement of the several co-operating parts without departing from the principles of the invention herein set forth.

I claim herein as my invention:

A burner comprising in combination a stationary air nozzle having a constricted end, a slide bracket secured in co-axial alinement with the constructed portion of said air nozzle, a tube slidably mounted in said bracket having a fuel nozzle at one end cooperating with the constricted portion of said air nozzle to constitute a valve therefor, an adjustable valve disposed in said tube for controlling the passage of said fuel nozzle and a screw mechanism connecting said tube and slide bracket whereby the fuel nozzle is axially movable relative to the air nozzle without subjecting the fuel conducting tube and nozzle to angular movement.

In testimony whereof, I have hereunto set my hand.

RANDAL E. TALLEY.