Dec. 4, 1923. 1,476,232

J. ZANDER

GAS MIXER

Filed Oct. 17, 1921

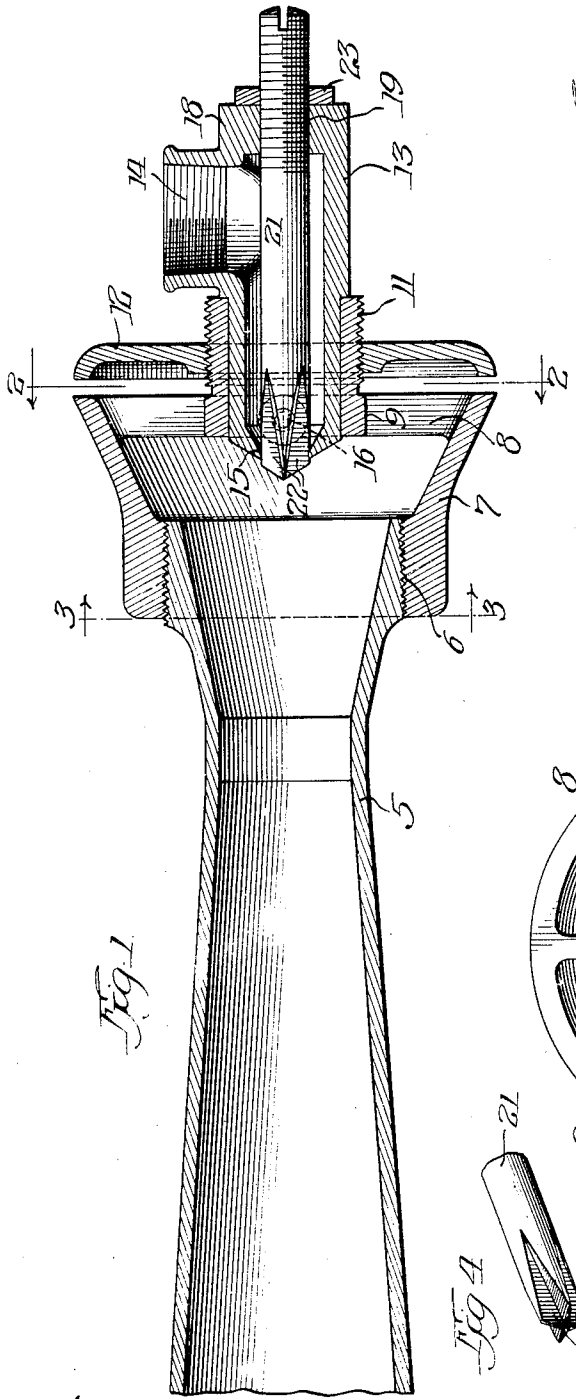


Fig. 1

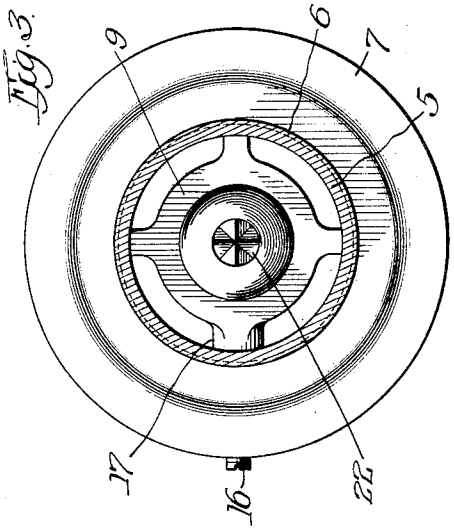


Fig. 3

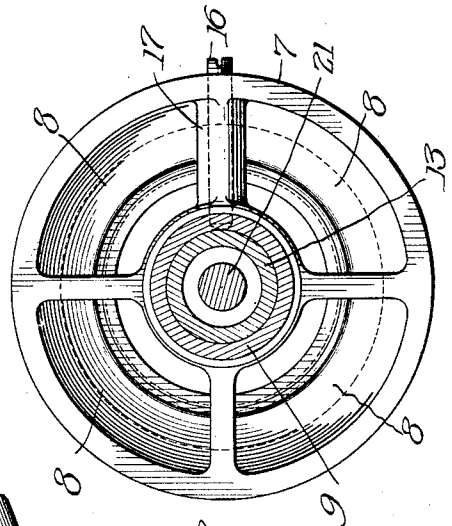


Fig. 2

Fig. 4

Witness:
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Patented Dec. 4, 1923. 1,476,232

UNITED STATES PATENT OFFICE.

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GAS MIXER.

Application filed October 17, 1921. Serial No. 508,272.

To all whom it may concern:

Be it known that I, JOHN ZANDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas Mixers, of which the following is a specification.

This invention pertains to mixers for mixing fuel gas with the requisite amount of air to produce an efficient combustible mixture, and has more particular reference to certain features of improvement by which the accuracy and efficiency of mixers of this general character are improved.

It has heretofore been customary to regulate the supply of gas for the mixer by means of a needle valve threaded into one end of the nozzle body and projecting into the nozzle proper so that by adjusting the needle inwardly or outwardly, the effective area of the nozzle through which the gas is admitted may be regulated. Unless all of the holes, however, are drilled with extreme accuracy and the needle be absolutely straight, accurately made and accurately aligned with the nozzle, it will not be disposed in the center of the nozzle, but on the contrary, will be more or less eccentric with respect thereto so that the force of the jet is directed against the side wall of the mixing tube, and the siphonic action which draws in the proper amount of air is greatly impaired, with the result that the pressure in the burner heads is reduced, thereby reducing the efficiency of the apparatus.

One of the primary purposes of my present invention is to provide a mixer in which the regulating valve will be positively guided at all times in the nozzle so as to be accurately centered with respect thereto, thus insuring the delivery of the gas in the proper direction into the mixing head and reducing the liability of breakage of the parts, as well as decreasing liability of inaccuracy in operation resulting from wear.

Another purpose of my invention is to provide an improved shutter by which the quantity of air delivered to the mixing head may be regulated to a fine degree of nicety.

Another object is to provide a mixer which will be simple in construction, economical to manufacture, and easy to assemble, and one which will be durable, reliable, and efficient in operation.

Other objects and many of the inherent advantages of this invention should be readily appreciated as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a longitudinal sectional view of a mixer embodying my invention;

Fig. 2 is a transverse sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a similar view on the line 3—3 of Fig. 1; and

Fig. 4 is a perspective of the regulating screw.

Referring now to the drawings more in detail, it will be observed that I have employed a delivery pipe for the mixture of fuel and air to the point of use, such as a furnace or boiler, for instance, which pipe is made in the form of a Venturi tube, and is indicated by reference character 5. This form of tube speeds up the mixture of air and gas and insures a thorough mixing so as to produce a uniform combustible mixture.

The outer end of this pipe is screw-threaded, as indicated at 6 for the attachment thereto of a mixer head 7. This head is hollow and is shaped at its inlet end to provide a plurality of (in the present instance four) air inlet openings or ports 8. The hub or central portion 9 of the head is cored to receive with a sliding fit, the gas supply nozzle, which will be later described, and is exteriorly threaded at 11 to receive a shutter plate 12 threaded thereon and adjustable toward and from the head proper so that the inflow of air through the ports 8 may be regulated to a fine degree of nicety by threading the shutter plate toward or from these ports.

The gas supply nozzle comprises a body 12 having a tapped coupling boss 14 to which the gas supply pipe is connected, the delivery end of the body being proportioned to snugly fit within the head of the mixer head and its delivery end being shaped to provide a nozzle proper 15 from which the gas issues into the mixer head, where it is mixed with the air. The nozzle may be locked in the position shown in Fig. 1 by means of a set screw 16 threaded into a tapped opening formed in one of the partition walls 17 of the mixer head between the ports 8. The outer end wall 18 of the nozzle body is tapped in alignment with the de-

livery end of the nozzle, as indicated at 19, to receive a gas controlling or regulating screw 21 which is adjustably threaded into said opening.

This regulating screw is of a diameter to snugly but rotatably fit the delivery opening of the nozzle 15 and, at its inner end, the screw is provided with a plurality of longitudinally extending tapered grooves 22 through which gas may be delivered from the nozzle. By turning the screw, it may be adjusted inwardly or outwardly to thereby vary the effective area of these grooves, thereby regulating the quantity of gas which will be delivered from the nozzle. Since the screw at all times projects through the nozzle, it will be obvious that the nozzle forms a bearing for the inner end of the screw by which the screw is accurately centered and maintained in axial alignment with the nozzle so that the gas will be delivered axially of the head, and the Venturi pipe 5 to insure a uniform mixing with the air entering through the ports 8, which could not be secured with the same degree of accuracy if the gas were delivered toward one of the walls of the mixer head, as it frequently has been with the tapered needle valves heretofore employed. The regulating screw is therefore accurately centered and guided at all times, and by properly adjusting the same the requisite flow of gas to the mixer head is insured and accurately controlled. When the screw has been adjusted to the requisite position, it is locked against accidental displacement by a lock nut 23 threaded thereon.

It will be apparent from the foregoing that I have provided a mixer by means of which both the quantity of air and gas may be accurately regulated and controlled and by which the gas will be delivered axially of the mixer head and in the desired quantities. The gas regulating screw is accurately centered and guided and may be adjusted without imposing strain upon the parts or producing any appreciable wear.

It is believed that my invention, and its attendant advantages will be understood from the foregoing without further description, and it should be manifest that the structural details shown and described are capable of considerable variation without departing from the essence of the invention as defined in the following claims:

1. In a gas mixer, the combination of a mixing head provided with air inlet ports, means for regulating the flow of air through said ports, means for supplying gas to said head, said means comprising a nozzle body attached to the head and provided with a delivery nozzle, and a gas regulating screw threaded in said body and projecting through the nozzle, the inner end of said screw being provided with longitudinally extending tapered grooves of maximum depth at the inner end of the screw through which gas is delivered from the nozzle, said screw being longitudinally adjustable with respect to said body to vary the effective areas of said grooves.

2. In a gas mixer, the combination of a mixing head and means for delivering gas thereto, said means comprising a nozzle body provided with a nozzle proper and a gas regulating member rotatably fitting said nozzle proper and longitudinally adjustable with respect thereto, said member being provided with longitudinal grooves converging toward and of maximum area at the inner end of said member to direct gas through the nozzle toward the center of the mixing head.

JOHN ZANDER.