

Sept. 4, 1923.

R. M. GIBSON

1,466,795

FUEL MIXER

Filed March 3, 1922

2 Sheets-Sheet 1

Fig. 3.

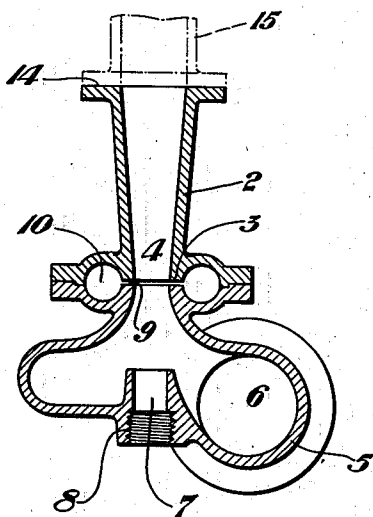


Fig. 1.

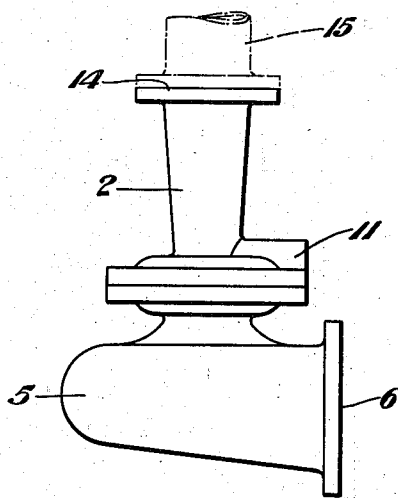
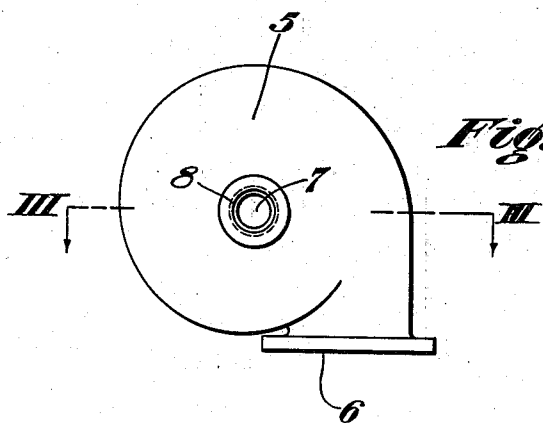


Fig. 2.



Witnesses:

Edwin Trueb

Inventor:

ROBERT M. GIBSON,

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2 Sheets-Sheet 2

Fig. 6.

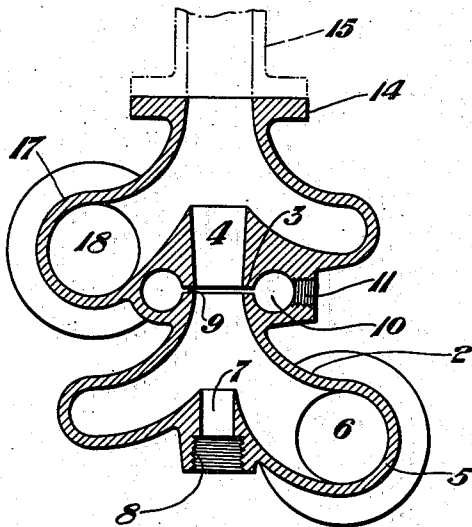


Fig. 4.

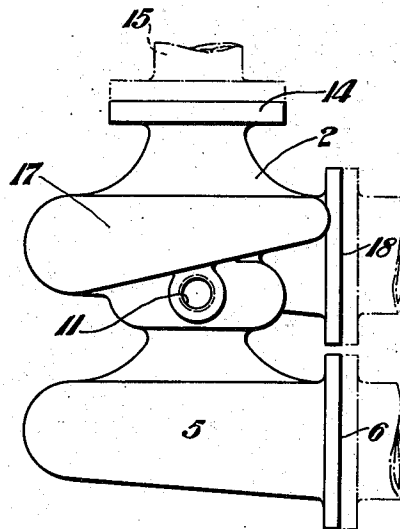
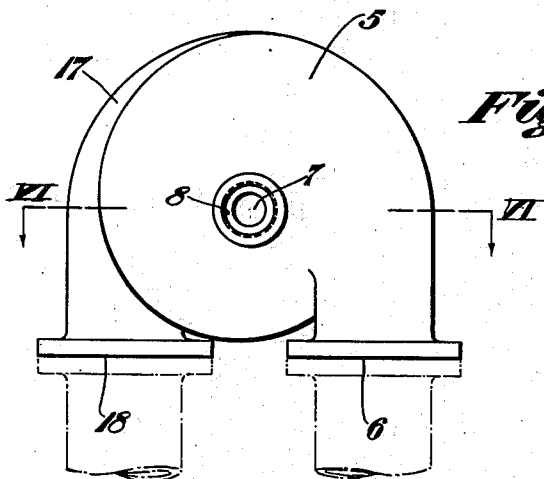


Fig. 5.



Witnesses:
Edwin Truett

Inventor:
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UNITED STATES PATENT OFFICE.

ROBERT M. GIBSON, OF PITTSBURGH, PENNSYLVANIA.

FUEL MIXER.

Application filed March 3, 1922. Serial No. 540,874.

To all whom it may concern:

Be it known that I, ROBERT M. GIBSON, a citizen of the United States, and resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Fuel Mixers, of which the following is a specification.

This invention relates to fuel mixers for mixing fuel and air prior to their entrance into a burner, and has for one of its objects the provision of a mixer adapted to mix either gaseous, powdered, or liquid fuel or any combination thereof with air without the addition, adjustment, or change of parts.

Another object is to provide a mixer that will more thoroughly mix the air and fuel, or fuels prior to their passing into the burner, than mixers heretofore provided.

A further object is to provide a mixer that has the novel construction, design, and combination of parts hereinafter described and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of a mixer embodying my invention.

Figure 2 is a rear end elevation thereof.

Figure 3 is a sectional plan on the line III—III of Figure 2.

Figure 4 is a side elevation of a slightly modified form of mixer.

Figure 5 is a rear end elevation of the mixer of Figure 4.

Figure 6 is a sectional plan on the line VI—VI of Figure 5.

Referring particularly to the drawings, the numeral 2 designates the substantially cylindrical elongated casing which is contracted intermediate its ends at 3 and forms a mixing chamber 4 having a Venturi tube shape, so that the air and fuel will flow through said chamber and into the burner with increased velocity.

The rear end of the casing 2 is enlarged, forming a circular air chamber 5, which has its one side open to the mixing chamber 4 and has an inlet 6 which is at right angles to the longitudinal axis of the chamber 4. That is, the chamber 5 and inlet 6 provide for entering a stream of air tangentially into the mixing chamber 4 so that it will have a whirling motion when traveling through the mixing chamber, and thus more thoroughly mix with the fuel. The air chamber 5 may be connected with a fan or

blower or any other suitable air supply desired.

At the rear end of the casing and on a line with the longitudinal axis thereof is a fuel inlet 7 which is adapted to admit gaseous or powdered fuel into the mixing chamber. The rear end of this inlet is provided with a screw thread 8, so that a suitable fuel conduit may be connected thereto. It will be understood that the fuel entering the inlet 7 will be under sufficient pressure to force it into the mixing chamber 4 where the air from the air inlet 6 will carry it forward into the burner.

The chamber 4 is provided with a second fuel inlet which is in the form of an annular slot 9 which extends around the inner periphery of the chamber 4 at its most restricted point and which communicates with an annular chamber 10 which extends around the casing 2 and has an inlet port 11 adapted to be connected to a suitable source of fuel supply. The fuel inlet 9 and chamber 10 is adapted to admit liquid fuel to the chamber 4, and due to the novel Venturi tube shape of the chamber 4 and the position of the inlet 9, the liquid fuel will enter the chamber 4 at the point in its length where the air or mixture of air and fuel is at its highest velocity and consequently such fuel will be readily atomized and carried into the burner.

The forward end of the casing 2 is provided with a connecting flange 14 by which the mixer may be connected to a tube or pipe 15, which may be a burner tube or may lead to a burner tube of any desired construction.

In Figures 4 to 6, inclusive, I have shown a modified form of mixer which is substantially the same as the mixer of Figures 1 to 3 inclusive, with the exception that the casing 2 is enlarged at a point immediately forward of the contracted portion 3 to form a second circular air chamber 17, which has its one side opening into the mixing chamber 4 forward of the contracted portion 3 and is provided with an inlet 18 which is at right angles to the longitudinal axis of the mixing chamber 4. That is, the chamber 17 and inlet 18 provide for entering a second stream of air tangentially into the mixing chamber 4 so that the air will have a whirling motion when traveling through the chamber 4. This second stream of air

will cause a more thorough mixture of the fuel with air, and while not necessary with some fuels, is desirable when using others, and therefore may or may not be used with my mixer, as desired.

The operation of this invention will be readily understood. When burning gaseous or powdered fuel, the fuel will be admitted through the fuel inlet 7 and air will be admitted through the inlet 6 of air chamber 5. The fuel will be under sufficient pressure to carry it into the mixing chamber 4 where the whirling stream of air from the air chamber 5 will pick it up and thoroughly mix it with the air. The mixing operation is also aided by the contracted portion 3 of the chamber 4, which contracts the stream of air and fuel and brings the mass into more intimate contact. If, for any reason, the fuel passing through the inlet 7 is insufficient, liquid fuel may be added to the mixture passing through the chamber 4 at the point 3 by the inlet 9, and thus a sufficiently rich mixture may be obtained. Also, if it is desired to utilize liquid fuel alone, it is admitted through the inlet 9 and the air passing through the chamber 4 from the air chamber 5 will pick up and atomize the fuel and carry it forward into the burner.

The function of the second air chamber 17 shown in the modified construction has been described. This air chamber serves to admit additional air when found necessary in utilizing some classes of fuel.

While I have shown the mixer of Figures 1 to 3 as composed of but two pieces and the mixer of Figures 4 to 6 as composed of a single casting, it will be understood that I do not limit myself to this construction since these mixers may be constructed of several parts secured together in any well known manner if found necessary or desirable.

It will be understood that various modifications in design and construction may be made without departing from the scope of my invention as defined in the appended claims.

I claim:—

1. A fuel mixer comprising an elongated hollow casing having a contracted portion intermediate its ends to form a Venturi tube mixing chamber, said casing being provided

with a fuel inlet in its rear end, an air inlet entering said chamber tangentially at a point forward of said fuel inlet and to the rear of the contracted portion, and a second fuel inlet entering through the side wall of said casing at its most contracted point and adapted to direct fuel transversely of the mixing chamber.

2. A fuel mixer comprising a substantially cylindrical casing, said casing being contracted intermediate its ends to form a Venturi tube mixing chamber, and said chamber being provided with a plurality of fuel inlets and an air inlet, one of said fuel inlets being located in the rear end of said casing on a line with the longitudinal axis of said mixing chamber, and said air inlet being arranged to enter said mixing chamber tangentially at a point to the rear of said contracted portion.

3. A fuel mixer comprising a substantially cylindrical casing, said casing being contracted intermediate its ends to form a Venturi tube mixing chamber, and said chamber being provided with a plurality of fuel inlets and an air inlet, one of said fuel inlets being located in the rear end of said casing on a line with the longitudinal axis of said mixing chamber, and another of said fuel inlets being in the form of a narrow slot extending around the inner periphery of said chamber at its most restricted point, and said air inlet being arranged to enter said mixing chamber tangentially at a point to the rear of the most restricted point in said chamber.

4. A fuel mixer comprising a substantially cylindrical casing, said casing being contracted intermediate its ends to form a Venturi tube mixing chamber, and said chamber being provided with a plurality of fuel inlets and an air inlet, one of said fuel inlets being located in the rear end of said casing, and another of said fuel inlets being in the form of a narrow slot extending around the inner periphery of said chamber at its most restricted point, and said air inlet entering said chamber at a point between said fuel inlets.

In testimony whereof I have hereunto signed my name.

ROBERT M. GIBSON.