J. E. ANDERAU.

HEATER FOR GASEOUS FLUIDS.

APPLICATION FILED DEC. 2, 1913.

1,132,420.

Patented Mar. 16, 1915.

2 SHEETS-SHEET 1.

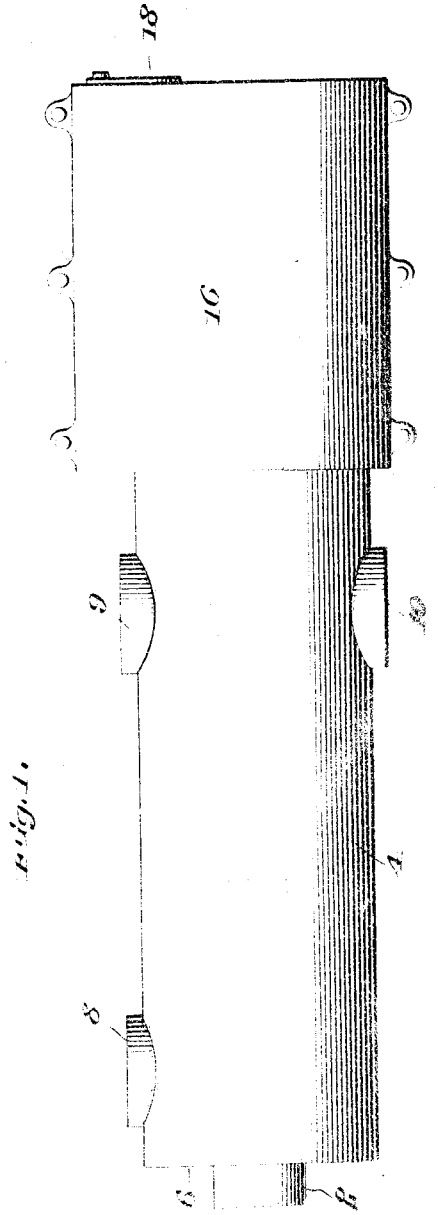


Fig. 1.

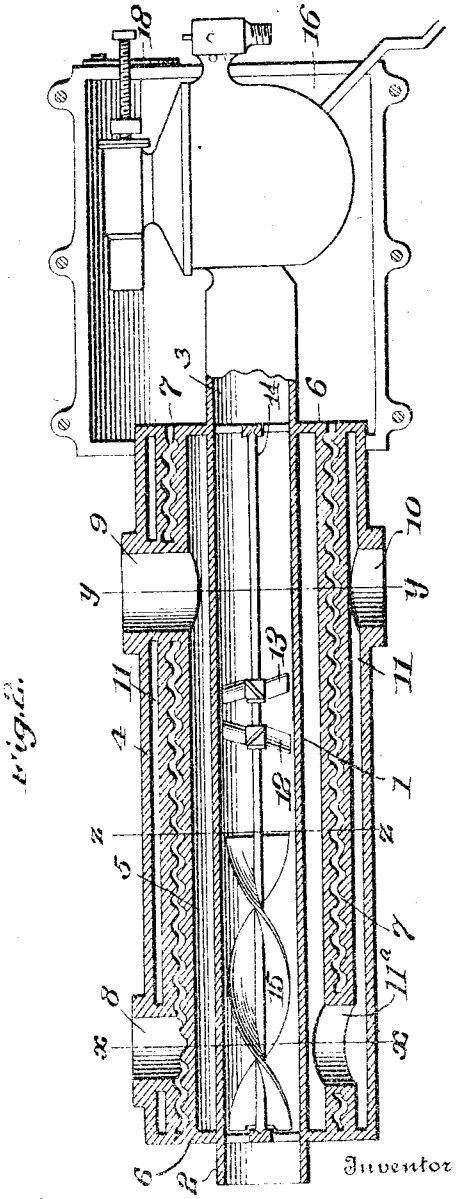


Fig. 2.

Witnesses

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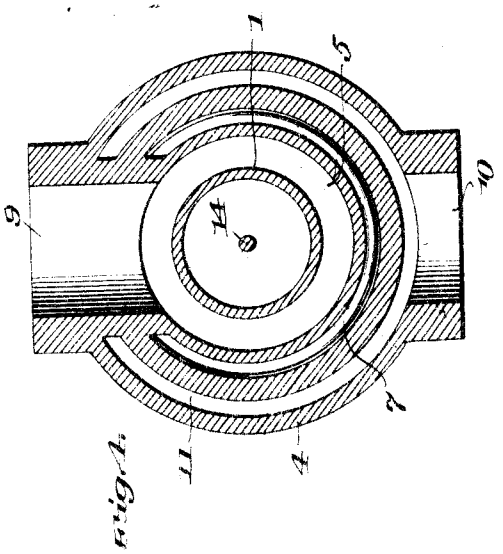


Fig. 4.

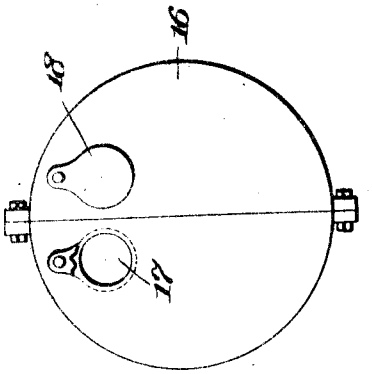


Fig. 6.

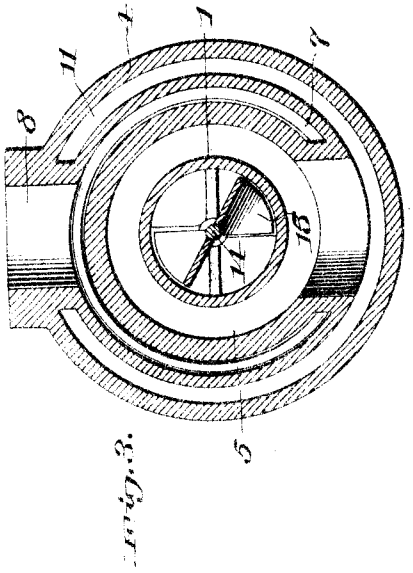


Fig. 3.

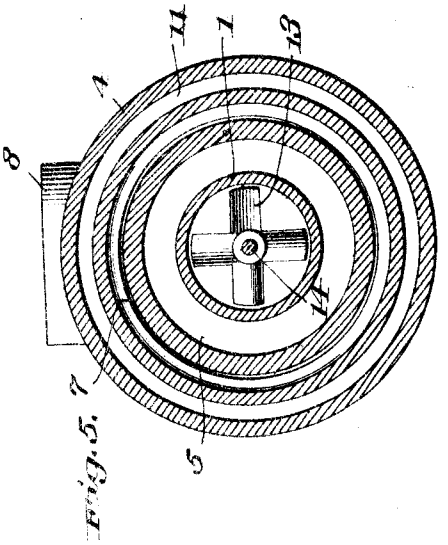


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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HEATER FOR GASEOUS FLUIDS.

1,132,420. Specification of Letters Patent. Patented Mar. 16, 1915.

Application filed December 2, 1913. Serial No. 804,307.

To all whom it may concern:

Be it known that I, JOSEPH ENGELBERT ANDERAU, a citizen of the United States, residing at Terlingua, in the county of Brewster and State of Texas, have invented new and useful Improvements in Heaters for Gaseous Fluids, of which the following is a specification.

The invention provides an attachment for use in connection with internal combustion engines whereby heavy oil, such as distillate, may be advantageously used as fuel without carbonizing the engine to any greater extent than when gasolene or naphtha is used as fuel.

The invention provides a device for heating the air on its way to the carbureter and for further heating and mixing the gaseous mixture on its way from the carbureter to the engine, said device utilizing the exhaust gases as the heating medium.

The invention consists of the novel features, details of construction and combination of parts, which hereinafter will be more particularly set forth, illustrated in the accompanying drawings, and pointed out in the appended claims.

Referring to the drawings, forming a part of the specification, Figure 1 is a view in elevation of a heater embodying the invention. Fig. 2 is a central longitudinal section. Fig. 3 is a transverse section on the line x—x of Fig. 2. Fig. 4 is a cross section on the line y—y of Fig. 2. Fig. 5 is a transverse section on the line z—z of Fig. 2. Fig. 6 is an end view of the device, showing the casing in which the carbureter is located.

Corresponding and like parts are referred to in the following description, and indicated in all the views of the drawings, by the same reference characters.

The device comprises a tube 1, which may be of any length and diameter. One end of the tube, as 2, is adapted to be connected with the engine, whereas the opposite end, as 3, is adapted to have any make of carbureter coupled thereto. A hollow body 4 is mounted upon the tube 1 and is spaced therefrom, as indicated at 5, said space being closed at opposite ends by means of inner flanges 6 formed with the body 4. An annular passage 7 is formed in the body 4, said passages being closed at the outlet end of the device and open at the receiving end. The passage 7 is tortuous, the walls being corrugated or fluted, thereby increasing the extent of the wall surfaces for radiating heat, whereby air passing through the passage 7 is heated to such an extent as to insure vaporization of the fuel. An air inlet 8 is provided near one end of the hollow body and is in communication with one end of the passage 7. An inlet 9 is located near the opposite end of the body and is adapted to make connection with the exhaust of the engine. An outlet 10 is located at one side of the body 4 near the end provided with the inlet 9. The inlet 9 leads into the space 5 and, said space has connection with an annular space 11, by means of a passage 11ª, which in turn makes connection with the outlet 10. The exhaust entering the inlet 9 travels through the space 5 to the opposite end of the device and there makes connection with the space 11, through which it travels to the outlet 10. It will thus be observed that the passage 7 is located between the spaces 5 and 11 through which the exhaust from the engine travels, thereby thoroughly heating the incoming air to a high temperature before the same mixes with the fuel to produce the gas, the resultant mixture again being heated in its travel through the tube 1 on its way to the engine. It is further noted that the gaseous mixture traveling through the tube 1 is heated by the exhaust in its travel through the passage 5. The body 4 may have the passages 7 and 11 formed therein, but it is to be understood that the device as a whole may be constructed in one or more parts, as found most advantageous.

A plurality of fans 12 and 13 are arranged within the receiving end of the tube 1, said fans being alternately arranged so as to rotate in reverse directions, one of such fans turning to the right and the other to the left, thereby thoroughly agitating the gaseous mixture in its passage through the tube 1 to insure a breaking up of any particles of fuel, with the result that a homogeneous and thoroughly gaseous product is produced. The fans 12 and 13 are mounted loosely upon a rod 14, which is supported within the tube 1. A helix 15 is located in the delivery end of the tube 1 and imparts a rotary movement to the gaseous mixture in its discharge from the device. The helix is stationary, whereas the fans are rotatable. The gaseous mixture entering the tube 1 usually contains particles of fuel which have not been vaporized and these particles are

thrown outward against the heated walls of the tube 1 by the action of the fans and are vaporized. The gaseous mixture is further agitated and caused to come in contact with the walls of the tube by the action of the helix 15 which imparts a whirling motion to such mixture.

A casing 16 is fitted to the receiving end of the device and is adapted to inclose the carbureter which is attached to the end 3 of the tube 1. The casing 16 is preferably made of similar sections which have offstanding ears through which bolts or like fastenings pass. A side of the casing has openings 17 for the admission of air to mix with the air entering through the passage 7, the air openings 17 being controlled by means of pivoted shutters 18.

In order to distinguish the ends of the device the end 3 receiving the gaseous mixture from the carbureter is designated as the receiving end and the other to be connected with the engine is referred to as the delivery end because the gaseous mixture is discharged therefrom. In the operation of the device the exhaust from the engine enters through the inlet 9 and passes through the passage 5, thence returns through the passage 11 and passes off through the outlet 10. The exhaust in its travel heats the walls of the passages 7 and tube 1, with the result that the air entering the inlet 8 is heated in its travel through the passages 7, thus being discharged into the casing 16 in a highly heated state so as to effectively mix with the fuel supplied to the carbureter. The gaseous mixture leaving the carbureter and passing to the engine through the tube 1 is heated and is thoroughly agitated, whereby any particles of fuel are broken up and gasified. The fans 12 and 13 act as beaters to thoroughly agitate the gaseous mixture and effect vaporization of any particles of fuel contained therein. The helix 15 causes the gas to receive a whirling motion whereby any traces of fuel not thoroughly vaporized are further agitated and converted into gas.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention what is claimed as new, is:—

1. A fuel heater for internal combustion engines having a tube extending therethrough to be coupled at one end to the carbureter and to be connected at its opposite end to an internal combustion engine; said body having a passage surrounding the tube for heating medium, such as the exhaust from the engine, to travel through, and said body being further provided with an air passage exterior to the passage through which the heating medium is adapted to travel, said air passage being tortuous and having its walls fluted or corrugated; the air in its travel through such passage being highly heated preliminary to its supply to the carbureter.

2. A device of the character specified, the same comprising a casing provided with regulable air inlets, a tube having connection at one end with said casing and adapted to have its opposite end connected with an engine of the internal combustion type, means arranged within the tube for agitating and imparting a whirling movement to the gaseous mixture passing therethrough, a hollow body mounted upon the tube and spaced therefrom and formed with an outer space which is in communication with the inner space, said spaces adapted to have the exhaust from the engine pass therethrough and said hollow body being further provided intermediate of the inner and outer spaces with a tortuous passage which opens into the before mentioned casing at one end and has communication with the atmosphere at its opposite end.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH ENGELBERT ANDERAU.

Witnesses:

ALFRED A. NEWELL,

EDWARD DAHLGREN.