

(No Model.)

J. ROBISON.
GAS OR VAPOR AND AIR MIXING AND SPRAYING DEVICE.
No. 532,099. Patented Jan. 8, 1895.

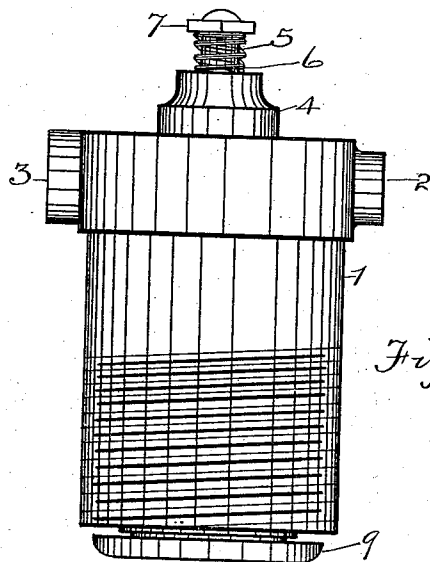


Fig: 1.

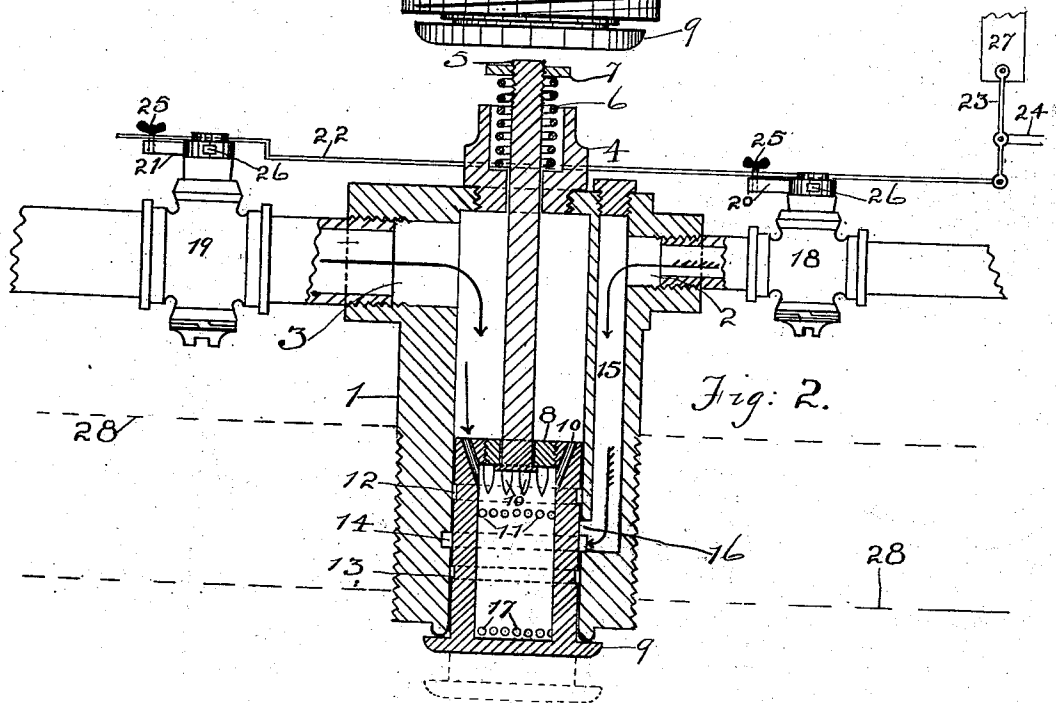


Fig: 2.

Witnesses
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UNITED STATES PATENT OFFICE.

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GAS OR VAPOR AND AIR MIXING AND SPRAYING DEVICE

SPECIFICATION forming part of Letters Patent No. 532,099, dated January 8, 1895.

Application filed May 24, 1894. Serial No. 512,310. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ROBISON, a citizen of the United States, residing at Greenbush, Rensselaer county, New York, have invented certain new and useful Improvements in Gas or Vapor and Air Mixing and Spraying Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a new and improved air and gas mixer and sprayer for gas engines.

In the drawings Figure 1 shows a side elevation of my device and Fig. 2 a vertical sectional view thereof with the regulation cocks shown in side elevation with their operating mechanism.

The numeral 1 shows the casing of my device; 2, the gas intake opening; 3, the air intake opening; 4, a screw plug attached to the valve controlling and mixing the gas and air which valve consists of a stem 5 having a regulating nut 7 and closing spring 6, the stem being attached to a chambered valve 9 consisting of a chamber having its upper end closed by an annular screw plug 8 in which the stem 5 is held and has openings 10 formed slantingly and affording ingress to the chamber from the top edge thereof.

The casing of the chamber or valve 9 has two grooves 12 and 13 formed in its outer surface and below the upper groove is a row of perforations 11 and near the bottom of the valve 9 is another row of perforations 17, the extreme bottom of the valve ending in a flange.

The main casing 1 has a central opening in which valve 9 rests and one of its sides has an opening 15 either bored or cored out, which opening 15 is in communication with the gas inlet 2 and at its lower end it opens into the interior of the chamber in main casing 1 but said lower opening is closed when valve 9 is in the chamber and closed.

Valves 18 and 19 are preferably attached

to the air and gas pipes as shown and their handles 20 are slotted and attached to a moving bar 22 by means of thumb or winged nuts 25, said bar 22 being a portion of a link lever and pivoted to actuating bar 23 which bar 23 is pivoted to a block or stationary piece 27, while the spindle of the engine governor 24 is pivoted to the actuating bar 23. The handles of the valves 18 and 19 are set in position to the valve stem by set screws 26 so that the handles 20 may be set at any angle desired.

A full understanding of the device will be had by means of the following description of the operation thereof.

The main casing 1 with its interior parts set in position therein is screwed into an opening in the cylinder of the gas engine so as to be in full and free communication with said interior. In order to supply the engine cylinder with the correct proportion of gas and air mixed, we will suppose that a gas is being used that requires in the mixture one part of gas to seven parts of air. It will be necessary therefore, to so set the valves 18 and 19 that while one part of gas is entering through gas valve 18, seven parts of air will enter through air valve 19 and this is done by turning the valves so that just this quantity of gas and air will pass through them respectively in the same space of time and under a given suction made by the down or suction stroke of the engine piston. The valves being so set the arms or handles 20 and 21 being slotted for that purpose, are attached by the winged nuts 25 to a rod 22 85 which forms a portion of a link lever device, the actuating link 23 being pivoted to the spindle of the governor preferably but it may be put in connection therewith in any other desired manner. Being so in connection with the governor, every extra demand for power on the engine causes the governor to so act as to pull on the link 23 which moves the rod 22 opening the valves 18 and 19 in exact proportion admitting more gas but also admitting more air with it, but keeping the admixture in the proportion of one to seven. When the load is thrown off the engine the governor acts to move the link in the opposite direction so that the valves 18 and 19 are partly closed 100

but still keeping the proportion of air and gas supplied to the cylinder as one is to seven. By this arrangement there is provided a means whereby the proportion of gas and air may be kept always constant and the proportions of the mixture may be in such quantities as may be determined on, as if a gas is being used that requires a mixture of one of gas to ten of air the valves may be set to supply that mixture and the governor will control the valves perfectly. The gas, as it enters chamber 15 can not pass out of the same when the valve 9 is closed, i. e., raised in the casing 1 to its highest point, by the spring 6, but the air from valve 19 enters the chamber in valve 9 through openings 10. As the piston makes a down or suction stroke (reference is had in this specification only to a vertical gas engine having its cylinder at the top of the frame) valve 9 is drawn down or opened when perforations 11 register with opening 16 when the gas passes through perforations 11 and mixes with the air in the chamber and is also drawn out of the same through openings 17 into the engine cylinder well mixed and sprayed and is then ready for the compression stroke of the piston which stroke acts to close the valve 9 in conjunction with spring 6 and after compression, the mixed gas and air in the cylinder is exploded.

The grooves 12, 13, and 14 are used as lubricators or oil reservoirs whereby the valve 9 is enabled to operate easily, the oil used as a lubricant resting in these grooves and against the sides of the valves.

It will be noticed that the handles to the valves 19 and 18, said handles being 20 and 21, are attached to the valve stem by set screws 26. In setting these valves so as to pass a certain quantity of gas or air, the set screw 26 is loosened and the handle set at such an angle as may be found adequate to leave the valve open to pass the desired quantity of gas or air, when the set screws 26, 26, are set fast after which the handles 20 and 21 are made movably fast to the rod 22 by the winged nuts 23, 23, after which the governor of the engine will operate the valves in accordance with the load thrown on or off the engine.

The dotted lines 28 show the top or head of the engine cylinder. The feathered arrows show the course of the gas and the plain arrows show the course of the air.

Having described my invention so that those skilled in the art may know how to make and use the same, what I claim, and desire to secure by Letters Patent, is—

1. A mixing and spraying device for oil or gas engines consisting of a casing having at least two chambers and a tubular valve arranged to move in one of said chambers and open and close an outlet port in the second, said valve partly filling the chamber it moves in, leaving

an open space in said chamber and having inlet ports leading from the interior of the valve to the said open space, and having other inlet ports constantly closed to the contents of said open space arranged so that when the valve is opened said ports will register with the outlet port of the second chamber, said valve having spraying ports arranged so that when the valve is opened the contents of both chambers after entering the valve will together be sprayed from the spraying ports into the engine cylinder and be closed when the valve is closed and having means for opening and closing the valve substantially as described.

2. In a mixing and spraying device for gas or oil engines, a casing having an air chamber and a gas or oil chamber and a tubular valve arranged to move in the air chamber and partly fill it leaving an open space in said chamber, said chamber being in communication with a supply of gas or oil, said valve having air ports leading from the air chamber into the valve and gas or oil ports leading from the gas or oil chamber into the valve, and having spraying ports, the air ports being constantly open and the gas or oil ports arranged to register with the outlet port of the oil chamber when the valve is open and to be moved out of register therewith when the valve is closed, the spraying ports being arranged to spray the air and oil or gas from the tubular valve into the engine cylinder when the valve is open and to be closed when the valve closes and having means for opening and closing the valve substantially as described.

3. In a device of the character described a casing as —1—, having an air chamber containing a tubular valve as —9— and having a gas or oil chamber as —15—, the tubular valve being closed by a removable device as —8— and having a valve stem and air inlet ports as —10— and gas or oil inlet ports as —11— and spraying ports as —17— said valve being arranged to move in said chamber and arranged so that air will enter the valve through the ports as —10— and when the valve is open gas or oil will enter said valve through ports as —11— and the gas or oil and air be sprayed into the engine cylinder through spraying ports as —17— and when the valve is closed the intake gas or oil ports and the spraying ports be closed shutting off all ingress or egress to the oil or gas and having means for opening and closing the valve substantially as described.

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

JOSEPH ROBISON.

Witnesses:

J. F. HARRIS,

W. M. BROWN.