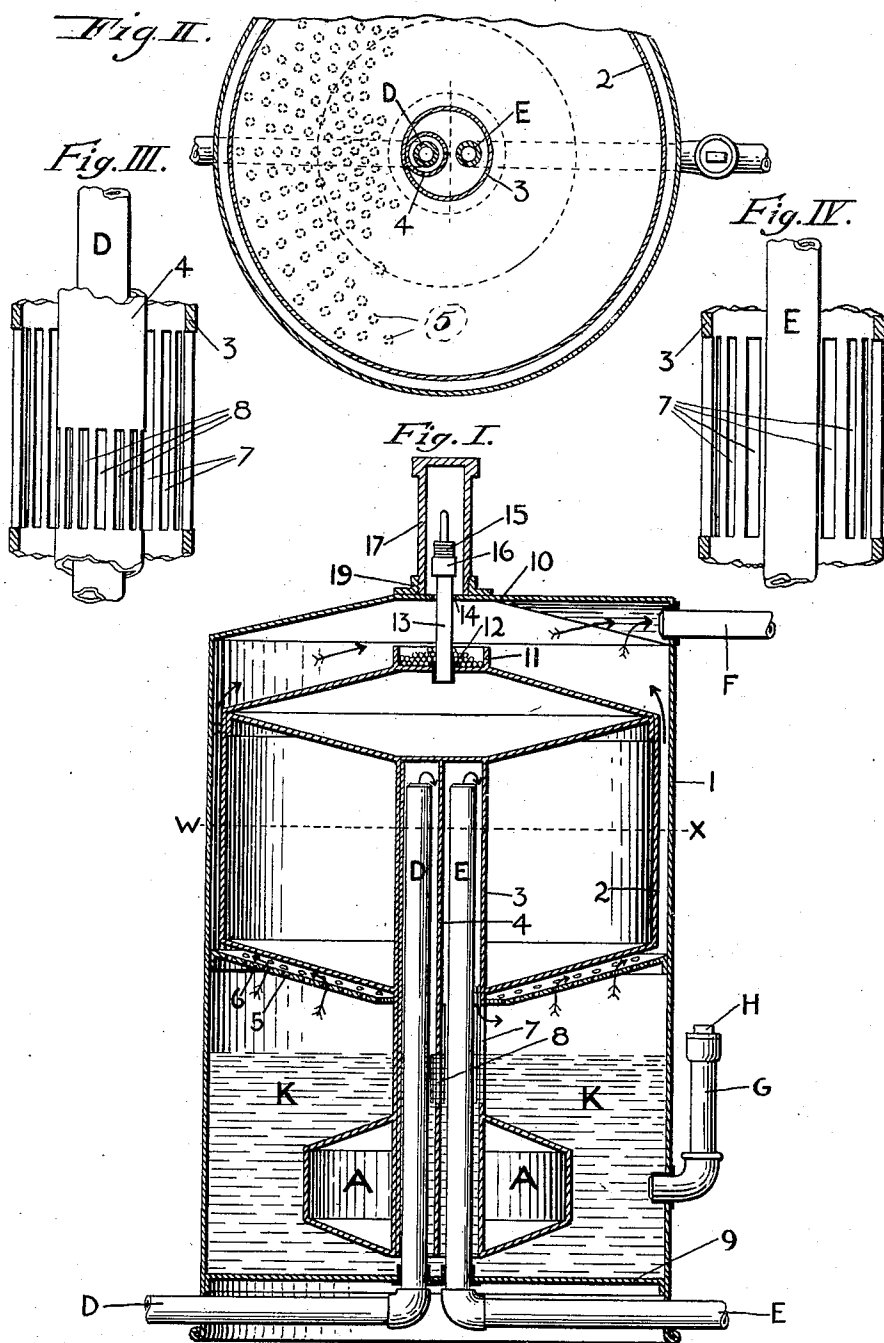


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W. J. LONERGAN.
GAS MIXING APPARATUS.
APPLICATION FILED MAR. 10, 1906.



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GAS-MIXING APPARATUS.

No. 845,104.

Specification of Letters Patent.

Patented Feb. 26, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM J. LONERGAN, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Gas-Mixing Apparatus, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a gas-mixing apparatus; and the object of my invention is to provide simple means for mixing gases or vapors in any proportions desired and which apparatus is readily adjusted so as to automatically feed the proper proportions of the gases which vary in specific gravity.

To the above purposes my invention consists of certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure I is a vertical section taken through the center of a mixing apparatus of my improved construction. Fig. II is a horizontal section taken on the line W X of Fig. I. Fig. III is an enlarged detail section of portions of telescoping tubes I make use of in carrying out my invention and showing the gas-discharge openings therein. Fig. IV is a vertical section of a second telescoping pipe and showing the gas-discharge apertures therein.

In the construction of the apparatus I make use of a vertically-arranged cylinder 1, preferably constructed of sheet metal and provided with a bottom 9 and top 10.

D and E designate gas-inlet pipes which pass beneath the bottom 9 and at the center of the cylinder 1 are extended upwardly through the bottom 9 adjacent one another and the upper ends of said pipes being open.

G designates a filler-pipe that enters the lower portion of the cylinder 1 and through which a suitable liquid K is introduced into the lower portion of said cylinder 1. The upper end of the tube G is closed by a cap H.

Arranged to telescope over the pipes D and E is a large pipe 3, to the lower end of which is fixed a hollow float A, which is normally submerged in a liquid K. Arranged within the large tube 3 and telescoping over the tube D is a tube 4, and the upper end of said tube 4 and the tube 3 are closed. The

tube 4 is provided with a series of short vertically-arranged slots 8, which are located in approximate alinement with the surface of the liquid K, and formed in the tube 3 is a series of vertically-disposed slots 7, which are longer and extend higher than the slots 8.

Fixed on the interior of the cylinder 1 and extending toward the tube 3 is a partition 6, which inclines downwardly from the cylinder 1 to the tube 3, and formed in said partition is a series of perforations 5. The opening in the center of the partition 6 is sufficiently large to allow the pipe 3 to move freely through said opening.

A cylindrical float 2 is rigidly fixed to the tube 3 above the partition 6, and arranged on top of the center of said float 2 is a cup 11, in which is adapted to be positioned small weights 12. Fixed to the top of the center of the float 2 is an upwardly-projecting guide-rod 13, which extends through a suitably-arranged aperture 14 in the center of the top 10. A collar 16 is fixed on the rod 13 above the top 10, and removably positioned on said collar is a series of weights 15. A cap 17 is removably positioned in a collar 19 over the upper end of the rod 13, which collar is fixed to the top 10. Leading from the upper end of the cylinder 1 is an outlet-pipe F.

The operation of my improved mixing apparatus is as follows: The pipes D and E are connected to the source of the gases or vapors that are to be mixed, the pipe D being the inlet for the gas having the lesser specific gravity and the pipe E being the inlet for the gas having the greater specific gravity. When properly connected, the heavier gas or vapor passes through the pipe E and discharges from the upper end thereof into the tube 3 and passes downwardly therethrough and out through the opening 7 and from thence upwardly through the perforations 5 around the float 2, thus filling the entire space above the liquid K, and finally passing out through the outlet F. If the floats 2 and A are lightened by removing some of the weights 12 and 15, their buoyancy will cause them to rise correspondingly, and thus bring the upper ends of the slots 8 above the surface of the liquid K, and when so positioned the gas having the lesser specific gravity will discharge from the upper end of the tube D into and through the tube 4 and will pass from thence through the vertical slots 8 into the

tube 3 and out through the slots 7 therein to mingle and mix with the gas having the greater specific gravity, and thus the specific gravity of the heavier gas or vapor is lessened and the floats 2 and A will correspondingly move downwardly, thereby wholly or partially shutting off the gas or vapor of lesser specific gravity. In this manner a perfect balance or equilibrium is effected and maintained. If the mixed gas or vapor is found to be too heavy or more of the lighter gas is desired, additional weights 12 or 15 are taken off, or if the resulting gas or vapor is found to be too light or more of the heavier gas or vapor is desired additional weights 12 and 15 are added. Thus the gases or vapors of different specific gravities are very thoroughly mixed automatically, and after the weights have been properly adjusted the apparatus needs no further attention.

The apparatus is simple, easily adjusted, and very effectually mixes gases or vapors of different specific gravities in proper proportions.

I claim—

1. In an apparatus of the class described, a tank which is partially filled with liquid, gas-supply pipes arranged in said tank, a float telescoping over said supply-pipes, there being discharge-openings formed in said float, means whereby the vertical position of the float is changed, and a discharge-pipe leading from the upper end of the tank; substantially as specified.

2. In an apparatus of the class described, a tank which is partially filled with liquid, gas-inlet pipes arranged in said tank, tubes telescoping on said inlet-pipes in which tubes are formed discharge-openings, a float secured to said tubes, means whereby the vertical position of the tubes and float is adjusted, and an outlet-pipe leading from the upper end of said tank; substantially as specified.

3. In an apparatus of the class described, a tank which is partially filled with liquid, gas-inlet pipes arranged in said tank, a tube telescoping over each one of the gas-inlet pipes, there being a series of slots formed in each tube in approximate horizontal alinement with the surface of the liquid in the tank, a float carried by the lower ends of the tubes which is submerged in the liquid, a float carried by the upper ends of the tubes, weights removably positioned on top of the upper end of the float, and an outlet-pipe leading from the upper end of the tank; substantially as specified.

4. In an apparatus of the class described, a tank which is partially filled with liquid, gas-inlet pipes arranged in said tank, a pair of tubes arranged to telescope on the gas-inlet pipes in which tubes are formed discharge-openings, and means whereby the vertical

positions of the tubes are changed corresponding to the specific gravity of the gas or vapor discharging from the openings in the telescoping tubes; substantially as specified.

5. In an apparatus of the class described, a tank which is partially filled with liquid, gas-supply pipes arranged in said tank, a tube arranged to telescope on the gas-supply pipes, a second tube arranged within the first-mentioned tube and telescoping on one of the gas-supply pipes, and there being discharge-openings formed in the telescoping tubes; substantially as specified.

6. In an apparatus of the class described, a tank which is partially filled with liquid, gas-supply pipes arranged in said tank, tubes telescoping over said supply-pipes, there being discharge-openings formed in said tubes, and means whereby the body of water within the tank is utilized to vary the passage of gas through the discharge-openings; substantially as specified.

7. In an apparatus of the class described, a tank which is partially filled with liquid, a gas-supply pipe arranged in said tank, a tube telescoping on said supply-pipe, in which tube is formed a series of discharge-openings which are in approximate horizontal alinement with the surface of the liquid, and means whereby the liquid is utilized for varying the passage of gas through the discharge-openings; substantially as specified.

8. In an apparatus of the class described, a tank containing a liquid-reservoir, a gas-supply pipe entering said tank, a submerged float, a float in the upper portion of the tank, and a slotted tube connecting the floats and telescoping the gas-supply pipe; substantially as specified.

9. In an apparatus of the class described, a tank containing a liquid-reservoir, a gas-supply pipe entering said tank, a submerged float, a float in the upper portion of the tank, a slotted tube connecting the floats and telescoping the gas-supply pipe, and means whereby the elevation of the floats is changed; substantially as specified.

10. In an apparatus of the class described, a tank containing a liquid-reservoir, a gas-supply pipe entering said tank, a submerged float, a float in the upper portion of the tank, a slotted tube connecting the floats and telescoping the gas-supply pipe, and a suitably-located gas-outlet pipe leading from the tank; substantially as specified.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

WILLIAM J. LONERGAN.

Witnesses:

M. P. SMITH,
E. M. HARRINGTON.