

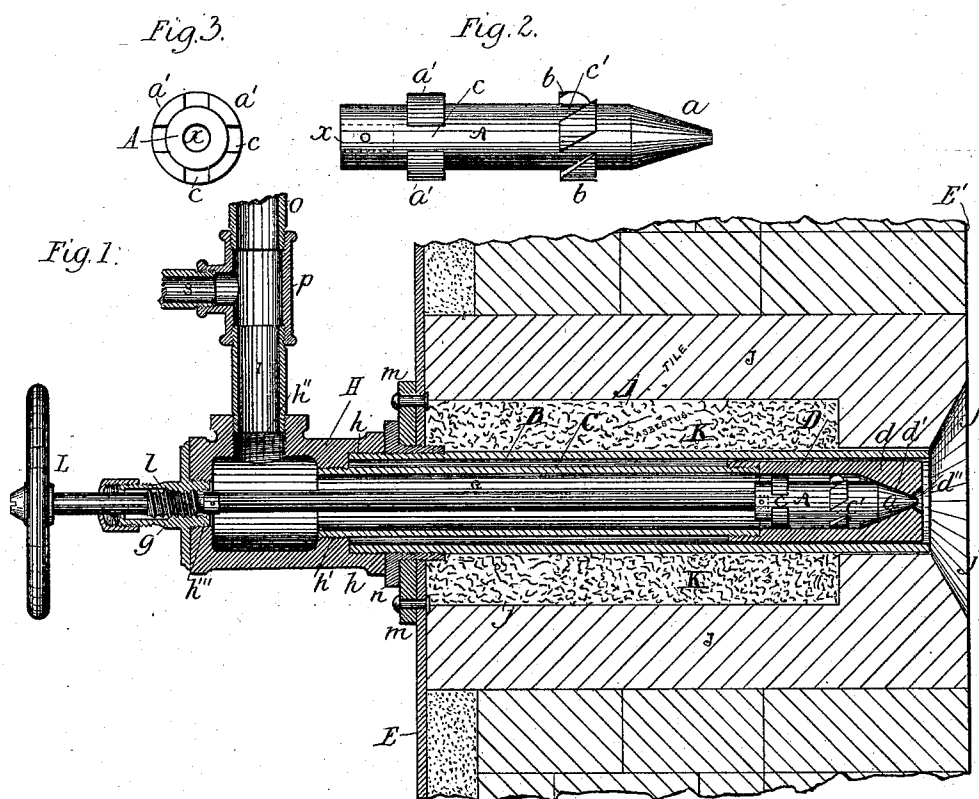
(No Model.)

O. N. GULD LIN.

OIL ATOMIZING AND CARBURETING APPARATUS FOR GAS GENERATORS.

No. 546,011.

Patented Sept. 10, 1895.



WITNESSES:

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OIL ATOMIZING AND CARBURETING APPARATUS FOR GAS-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 546,011, dated September 10, 1895.

Application filed November 9, 1893. Serial No. 490,440. (No model.)

To all whom it may concern:

Be it known that I, OLAF N. GULDIN, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Oil Atomizing and Carbureting Apparatus for Gas-Generators; 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.

This invention relates to an apparatus for carbureting or enriching water-gas with hydrocarbon vapor; and it relates more particularly to an improved device for atomizing hydrocarbon oil and injecting it into and mingling it with water-gas in the carbureting-chamber of the superheater of a water-gas apparatus.

The objects of my invention are to provide for more perfectly and economically carbureting water-gas with atomized or finely-divided hydrocarbon oil and doing away with the jet of steam usually employed for injecting and spraying oil, and thereby effecting the saving of a large per cent. of hydrocarbon oil required for carbureting water-gas to the desired candle-power; also, to provide a simple, durable, and efficient device for atomizing liquid hydrocarbon and injecting it into and intimately mixing it with the water-gas in the carbureting and fixing chamber of the superheater, so as to thoroughly carburet the gas without diluting and deteriorating it with steam; also, to provide a device so constructed and arranged that the various parts may be readily detached and cleaned or repaired and quickly assembled for operation.

The matter constituting my invention will be defined in the claims.

My improved apparatus for carbureting water-gas is illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal section of my oil atomizing and injecting device applied in position in the wall of the superheater of a water-gas apparatus. Fig. 2 represents an elevation, on enlarged scale, of the atomizing-plug having a conical valve-section. Fig. 3 represents a rear end view thereof.

The atomizing-plug A of my device is con-

structed with a cylindrical body having a conical end *a*, serving as a valve, and said body is provided with a circle of lugs *a'*, projecting from its circumferential portion and forming between them a series of ducts or passages *c*, said lugs serving to break up the oil and also to guide the body A in its casing. The body A is also provided near its front end, just back of the conical end *a*, with a circle of diagonal or spiral lugs *b*, forming a series of diagonal or spiral passages *c'* for imparting to the oil a whirling motion as it is expelled from the atomizer into the carbureting-chamber. The lugs or projections *b* are formed upon or secured to the body A in position diagonal to the longitudinal axis of the plug and the intervening passages *c'* are formed in the same diagonal relation to the axis, and will therefore impart to the oil a whirling motion. It is to be noted that the inclined lugs *b* are arranged upon the surface of plug A so as to break joints with the lugs *a'*—that is, so that each lug *b* shall be in line with a passage *c* between the lugs *a'*, and will therefore serve to deflect the current of oil and assist in atomizing it.

The atomizing-plug A is inclosed within suitable tubes or casings, which are inserted in the wall E of the superheater, as will now be described. The external tube or casing B is preferably made of wrought-iron and is screw-threaded at its outer end to engage with the T-coupling H and bushing *n*. The inner tube or casing C is preferably constructed of wrought-iron and is screw-threaded at both ends, as shown. The nozzle D is preferably constructed of thick steel and is screw-threaded at its rear end, where it engages with tube C, and at its front end is provided with a thickened head *d*, having a conical valve-seat *d'* and a flaring vent or mouth *d''*. The nozzle D is made thick and strong to prevent it from being warped or readily burned out by the heat, and it serves to hold the atomizing-plug A and has a seat for its conical valve-section *a*, by means of which the flow of oil may be regulated and entirely shut off at will. The lugs *a'* and *b* of the atomizing-plug fit snugly within the nozzle D, so that the oil is compelled to pass through the passages *c* and *c'*. The stem or rod G is connected to plug A by a pin at the socket *x*, and

is also connected in a similar manner to the shaft of the hand-wheel L. The T-coupling H at the outer end of the casing is provided internally with screw-threaded seats *h* and *h'*, respectively, for connecting the tubes B and C, and also with the internally-screw-threaded branch *h''* and the screw-threaded opening *h'''* at its outer end. A stuffing-box *g* is secured to the end of the coupling H and is provided with a screw-threaded bearing for the screw-threaded portions *l* of the shaft L, by means of which the plug A may be adjusted out or in to regulate or shut off the flow of atomized oil. A T-coupling *p* connects by nipple I to the branch *h''* and has connecting with it the oil-supply pipe O and a steam-supply pipe S, the purpose of which will be hereinafter described.

The wall E of the superheater is constructed of brick and an iron jacket in the usual manner, and is provided especially for my atomizer and injector with a large tile J, having a recess or socket *j* for containing the asbestos or other non-conducting fireproof packing K, and said tile J is also formed at its inner end with a flaring opening *j'*, extending from the inner end of the injector-casing to the inner surface of the carbureting-chamber E'. A thick ring *m*, having a central screw-threaded opening, is riveted to the iron jacket of the wall E, and within the opening of this ring is inserted the screw-threaded bushing *n*, and within such bushing is secured the outer tube or casing B of the device. The asbestos packing K is packed around the casing B for protecting it from excessive heat. The outer casing B may be left in place within the wall E, while the casing C, with the nozzle D and atomizing-plug A, may be withdrawn to be cleaned or repaired. A protected passageway is thus formed in the wall for the atomizing device, so that it may be quickly replaced and secured in position for active use.

The device being constructed and secured in position as above described, the operation is as follows: The plug A is withdrawn a short distance from the seat *d'*, so as to leave a suitable opening for the escape of hydrocarbon vapor, and hydrocarbon oil is admitted, preferably under pressure, through pipe O into the casing C and is first deflected by the lugs *a'* through the longitudinal passages *c* and against the diagonal lugs *b*, by means of which it is dashed into spray, and is thence deflected through the diagonal or spiral passages *c'*, from which it is forced tangentially against the tapering seat *d'*, thereby further atomizing it, and the resulting vapor is thence discharged with a whirling motion through the flaring vent or mouth *d''* and the flaring opening *j'* into the carbureting-chamber E' of the superheater, where it is intimately mingled, on account of its whirling motion and finely-divided condition, with the inflowing water-gas. The atomized oil is quickly and uniformly diffused through the whole body of water-gas, thereby uniformly and ef-

fectively carbureting it to produce a gas of the desired candle-power. By the use of this device and method no oil is wasted by running down the wall of the generator and being burned and converted into lampblack, and a large saving of oil is also effected on account of the absence of steam, which is usually employed as the oil-injecting agent and which results in diluting and deteriorating the quality of the gas, and on account of which, therefore, a much larger quantity of oil is required to produce a given candle-power of gas. If oil is allowed to flow by gravity through an ordinary pipe into the superheater, it is apt to run down along the wall and the brickwork in streaks and injuriously cool the same, and thereby prevent vaporization and mixture with the water-gas. My device and method overcome these objections and produce greatly-improved results. The atomizing and injecting device is set in the brickwork with its front end back from the interior face of the wall of the carbureting-chamber, so that it is protected from intense heat; but in case the nozzle becomes clogged with thickened or burned hydrocarbon or the casing C becomes clogged by deposits of naphthaline or paraffin or other obstructions a jet of steam is admitted by pipe S, while the oil is shut off, and will quickly melt and force out the obstructive deposits.

This oil atomizing and injecting device has proved very effective and economical in practical operation, and by its use I have obtained greatly-improved results in the manufacture of carbureted water-gas.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an apparatus for carbureting gas, the combination with a casing having a nozzle and valve-seat, of an atomizing plug inclosed within said casing and provided with a valve-end and adapted to close on said seat and series of circumferential lugs arranged to break joints, longitudinally, one with another, and form intermediate passages for atomizing the oil, an operating stem connecting with said plug, and an oil supply pipe connecting with the casing, substantially as described.

2. In an apparatus for carbureting gas, the combination with a casing of an atomizing plug inclosed therein and provided with a series of circumferential lugs having passages parallel with the axis between them, and a series of lugs disposed diagonally to the longitudinal axle of the plug and having diagonal passages between them for atomizing the oil and giving it a whirling motion, and the oil supply pipe connecting with the casing, substantially as described.

3. In combination with the carbureting chamber of a superheater, a casing and nozzle having a valve seat, a cylindrical atomizing plug having a solid valve-end adapted to close on said valve seat, and the body of said plug, also provided with circumferential lugs, so disposed as to break joints one with another,

longitudinally, and part of said lugs being
disposed diagonally to the axis and having
diagonal or spiral passages between them for
atomizing the oil and giving it a whirling
5 motion, a stem connecting with said plug, and
an oil supply pipe connecting with the casing,
substantially as described.

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

OLAF N. GULDLIN.

Witnesses:

T. L. MARKEY,

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