M. F. SPARKS, M. B. ALLEN & R. A. ASTLEY.

GASOLENE GAS GENERATOR.

APPLICATION FILED AUG. 12, 1909.

984,448. Patented Feb. 14, 1911.

2 SHEETS—SHEET 1.

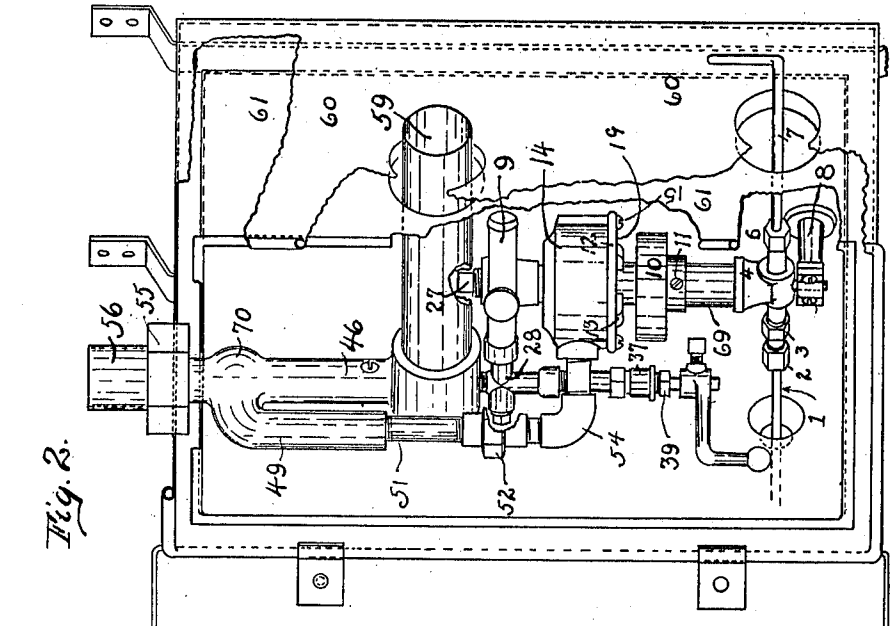


Fig. 2.

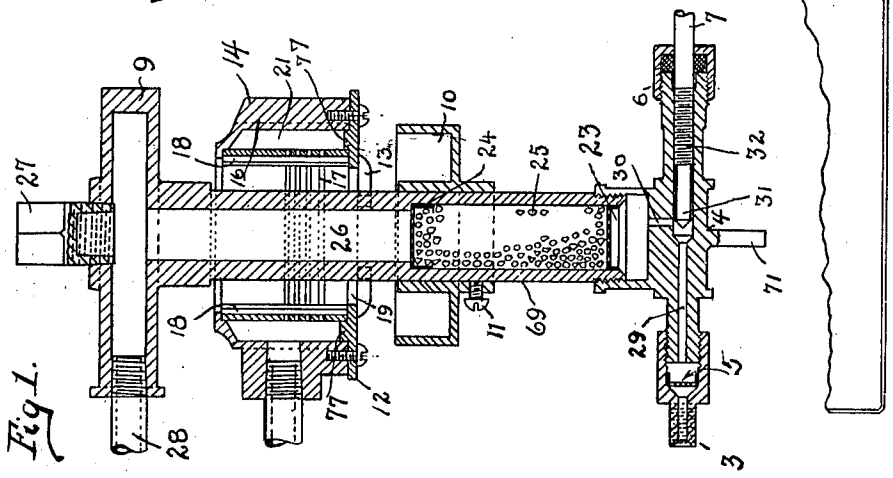


Fig. 1.

Witnesses:
J. J. Dougan
R. P. Randolph

Inventors:
Marion F. Sparks, Manson B. Allen
and Robert A. Astley.
By Clark C. Wood.
Attorney.

M. F. SPARKS, M. B. ALLEN & R. A. ASTLEY.

GASOLENE GAS GENERATOR.

APPLICATION FILED AUG. 12, 1909.

984,448.

Patented Feb. 14, 1911.

2 SHEETS—SHEET 2.

FIG 3.

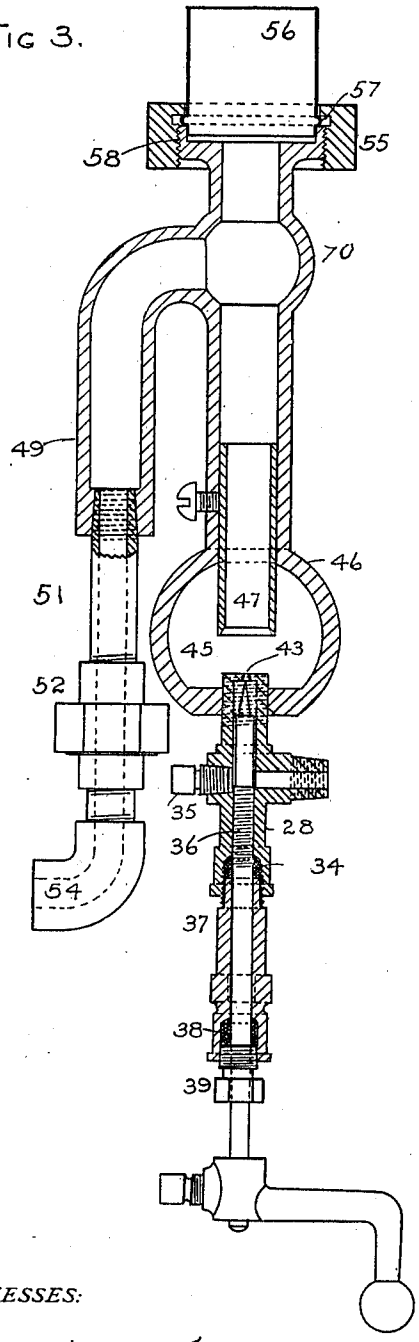


FIG. 4.

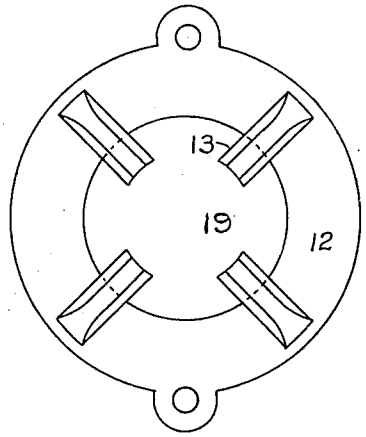
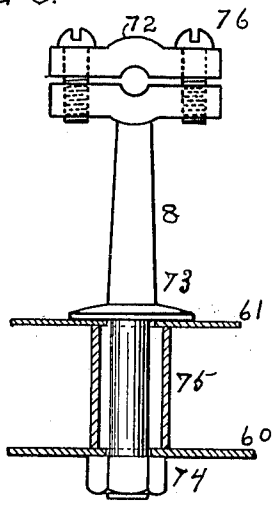


FIG 5.



WITNESSES:

Mamie Force

Louise E. Walsworth

INVENTORS:-

Marion F. Sparks

Marion B. Allen

Robert A. Astley

By Clark C. Worrel

ATTORNEY.

UNITED STATES PATENT OFFICE.

MARION F. SPARKS, MANSON B. ALLEN, AND ROBERT A. ASTLEY, OF LANSING, MICHIGAN.

GASOLENE-GAS GENERATOR.

984,448. Specification of Letters Patent. **Patented Feb. 14, 1911.**

Application filed August 12, 1909. Serial No. 512,515.

To all whom it may concern:

Be it known that we, MARION F. SPARKS, MANSON B. ALLEN, and ROBERT A. ASTLEY, citizens of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented certain new and useful Improvements in Gasolene-Gas Generators, of which the following is a specification.

Our invention relates to generators for the purpose of manufacturing gas from gasolene or similar volatile liquids, and more particularly to that type of such generators in which a separate generating flame supplied by a portion of the mixed gases is employed for the purpose of evaporating the volatile liquid and producing gas.

The objects of our invention are to improve the construction and operation of the device in various details more fully described in the specification, and to facilitate its insertion into and removal from the containing case.

We obtain these results by the means shown in the accompanying drawings in which—

Figure 1 is a vertical section of the generating portion of the device; Fig. 2 an elevation of the complete device in its case, a portion of one side of the case being broken away and the door open to show the arrangement of the parts. Fig. 3 is a vertical section of the mixing tube and jet, and Figs. 4 and 5 are details more fully explained hereafter.

Similar figures refer to similar parts throughout the drawings.

In its general features, the construction of our device is very similar to others of its type, and it is not deemed necessary to explain in detail all the features of the construction.

The gasolene is admitted into the generator through a very small tube or hollow wire 1 which passes through openings formed in the outer wall of the case. The wire is connected by a stuffing box 2 and half union 3 to the base fitting 4 of the generator. A very fine screen 5 is inserted in the union 3 for the purpose of preventing any particles of foreign matter, which may be in the gasolene, from entering the generator. This screen, as already stated, is extremely fine so as to stop the smallest particles and is preferably formed cup shape, as shown in Fig. 1, so as to facilitate its removal from the device when necessary to do so for cleaning or other purposes. After passing the screen 5, the gasolene goes through a passage 29 in the base fitting 4, the end of which is closed when desired by a plug valve 31, the construction of which differs from the ordinary type of such valves in that it effects a double closing of the passage, being so constructed that when closed it fits closely across the opening 30, and also abuts against the conically enlarged end of the passage 29. By this construction, it is found there is much less likelihood of the valve leaking when closed or of the passages becoming clogged, than in the ordinary type in which there is only one passage cut off by the valve and the flow of the liquid is toward the point of the plug instead of against it as in our device. The valve 31 is operated in the ordinary manner by a handle 7 and a screw 32 moving through a stuffing box 6.

The standpipe 69 differs from the ordinary construction in the following particulars: First, in order to avoid the difficulty arising from the effect of the intense heat employed in generating the gas upon the numerous screw joints usually used in such constructions, the entire standpipe 69 and storage chamber 9 are all cast out of one integral piece of metal. Second, in order to facilitate the removal of the carbon deposits which accumulate in the generating chamber 26, a removable plug 27 is inserted directly opposite the end of the chamber 26 which gives ready access for cleaning to both the storage chamber 9 and the generating chamber 26. Third, it has been customary in devices of this character, to fill the generating chamber 26 entirely full of gravel, or some similar substance, in order to check or prevent troublesome oscillations in the level of the liquid in the generating chamber and consequent great variations in the pressure of the gas. We have found, however, that a better effect is produced by enlarging the lower portion 25 of the standpipe and making a gravel chamber shorter and of greater diameter than in the ordinary construction, the gravel being retained in its place by screens 23 and 24 in the usual manner, the ledge formed at the junction of the chambers 25 and 26 serving to retain the screen 24 firmly in its position. By

this construction, the full effect of the gravel chamber is preserved, and all danger of clogging by accumulation of carbon is avoided; and, in addition to that, the generating chamber 26 is left entirely vacant and it is, therefore, extremely easy to remove from it the particles of carbon which accumulate to a greater or less extent in the process of the generation of the gas. It is also found that it is advantageous to make the portion of the generating chamber 26 smaller than the portion 25 thereof which contains the gravel; that, when so made, it is equally efficacious in the generation of the gas, and the thickened walls, made possible by the decreased size of the chamber, are much less likely to be injured by the heat of generation.

From the storage chamber 9 the gases pass through the tube 28 and the needle valve port 43 across the air chamber 45, where the gas draws in a supply of air in the usual manner through the pipe 59. We have found, however, that in order to guard against the escape of gasolene or gas into the case surrounding the machine in case of accident, leakage, or improper operation of the device, it is necessary to completely inclose the air chamber 45, and when so inclosed, it is found necessary to use an air chamber and air pipe much larger than is commonly employed. If this is not done, the supply of air is restricted, and not only is the mixture of the air and gas too rich for the best results, but the pressure in the distributing pipes is too low. We therefore construct the mixing chamber 45 so as to entirely inclose the Bunsen tube 47 and make it very much larger than would ordinarily be necessary to carry a sufficient supply of air, it being found advisable to give the air chamber 45 an area not far from ten times the area of the Bunsen tube 47. The mixing tube 46, the air chamber 45, the connection 58 for the distributing pipe 56, and the branch through which the supply of gas for generating purposes is taken, are all cast from one integral piece of metal. In this respect, it also differs from the ordinary types of this construction which are joined together by couplings and unions of various styles. After passing through the Bunsen tube 47 and the mixing tube 46, and becoming thoroughly mixed with air, the greater portion of the mixed gases passes through a distributing pipe 56 to its destination for use. A portion, however, goes back through the arm 49 of the mixing tube 46, through the pipe 51, the union 52, and elbow 54 into the generating chamber 21 of the generating burner 14 from which it escapes through the slits 17, where it is lighted and keeps the main generating chamber 26 and the storage chamber 9 intensely heated with a very small expenditure of gas.

In order to facilitate the passage of the gas from the mixing tube 46 into the arm 49, a spherical enlargement 70 is formed in the mixing tube 46. The effect of this is to produce eddy currents which, to a certain extent, retard the onward flow of the gases toward the pipe 56, and therefore facilitate their entry into the pipe 49. This enlargement also serves an additional purpose. It sometimes occurs that a small portion of the liquid is condensed in the tube 56. If the enlargement 70 were not there, this liquid, as it ran down the sides of the tube 56, would be very apt to enter the arm 49; but on account of the peculiar construction of the enlargement 70, it follows down the curved sides and is nearly, or quite, evaporated before reaching the Bunsen tube 47.

All leakage of gas or liquid from the tube 56, is cut off by the peculiar construction by the union 55. It will be noted that the male portion 58 of the union is hollowed out in its upper portion into a cavity just large enough to fit closely the outside of the end of the distributing tube 56 which extends down into it a short distance. A bead 57 is formed on the pipe 56, and this bead is compressed between the end of the male member 58 of the union and an inwardly extending flange on the outer portion 55. The bead 57 thus serves as a packing to prevent the escape of any gas or liquid, and makes it unnecessary to employ any gasket or packing rings for the purpose of making a tight joint. The tube 56 also extending down into the upper portion of the union, if any liquid flows down, it will at once pass into the mixing tube 46 as already described.

In its general features, the construction of the generator burner 14 is similar to other well known devices. It differs, however, in the means for heating the generating chamber 26 when the device is first being put in operation. In our device, a cup 10 of the usual construction, retained in place by a set screw 11, is adapted to slide on the standpipe 69. The bottom plate 12 of the generating burner is of peculiar construction. It consists of a main body 12 which is provided with a centrally disposed circular opening 19 therein of a greater diameter than the diameter of the generating chamber on which is integrally formed an upwardly projecting flange 77 adapted to fit closely between the outer casing 16 of the generating burner 14 and the inner wall 18 thereof. A plurality of inwardly extending projections 13 are formed on the lower side of the plate 12 and extending inward so as to abut against the standpipe 69. These projections serve to keep the standpipe 69 concentric with the plate 12; they also serve to divide the ascending stream of burning gases from the cup 10 and bring them more closely into contact with the walls of the generating

chamber 26. Being directly exposed to the fire, they also become intensely heated and assist greatly in heating the generating chamber 26 and also the generator burner 14, and prevent smoke.

For the purpose of facilitating the cleaning of the pipe 28, a plug 35 is inserted directly opposite it as shown in Fig. 3, and it is evident that by unscrewing the needle valve 43, till it has passed the end of the pipe 28, and removing the plug 35, the entire passage will be fully opened and accesible.

In order to facilitate the removal of the device from the outer case when necessary, it is supported at its lower extremity on a bracket 8, the construction of which is shown in Fig. 5. The flange 73 is formed integrally on the bracket 8 and a screw thread adapted to receive the nut 74 is cut on the extremity. A thimble or collar 75 of the length equal to the distance between the outer case 60 and the inner case 61, is loosely fitted on the stem of the bracket 8 between the inner and outer cases so that when the nut 74 is tightened, the inner case is tightly held by the flange 73 and the thimble 75, and the outer case by the nut 74 and the thimble 75, the bracket thus being held rigidly in position. A clamp 72 formed of two separable members, is adapted to receive a projection 71 integrally formed on the base fitting 4 and to hold it rigidly in position by tightening the screws 76. It is also evident that by taking off the removable member of the clamp 72, separating the union 55, and disconnecting the pipes 1 and 69, the entire device may be readily removed from the case.

Devices of this character are commonly used under very high pressure and because of this, and the heat of the burner, a stuffing box of the ordinary character is found insufficient to prevent leakage around the shaft 36. In order to accomplish this result more perfectly, we have made a double stuffing box by extending the collar 37, which in connection with the cavity 34, forms the first stuffing box, and forming a second cavity 38 in the opposite extremity into which is screwed a collar 39, this second stuffing box, being removed from the heat of the generator and the gas, remains for a long time perfectly tight.

We claim as our invention and desire to secure by Letters Patent:

1. In a gas generator, a vertically disposed generator stand pipe provided with an enlarged lower portion adapted to receive a granular filling, a gasolene supply pipe communicating with the lower end of the stand pipe, a gas pipe in communication with the upper end of the stand pipe, a generator burner surrounding the upper end of the stand pipe and spaced therefrom, said burner being provided with gas ports in the inner wall thereof, and a pipe connecting said generator burner and said gas pipe.

2. In a gas generator, a vertically disposed generator stand pipe provided with an enlarged lower portion adapted to receive a granular filling, a gasolene supply pipe communicating with the lower end of the stand pipe, a gas pipe in communication with the upper end of the stand pipe, a generator burner surrounding the upper portion of the stand pipe and spaced therefrom, an oil cup secured to the stand pipe directly below the generator burner, and a pipe connecting said generator burner and said gas pipe.

3. In a gasolene gas generator, a generator tube, a generator burner positioned adjacent said generator tube, a vertically disposed mixing tube provided with an air chamber in the lower end thereof and with an enlarged portion intermediate the ends thereof, the portions of said mixing tube directly above and below said enlarged portion being of uniform diameter, a connection between the generator tube and the air chamber of the mixing tube, and a pipe extending from the enlarged portion of the mixing tube to the generator burner.

In testimony whereof we affix our signatures, in the presence of two witnesses.

MARION F. SPARKS.
MANSON B. ALLEN.
ROBERT A. ASTLEY.

Witnesses:
WILLIAM C. BROWN,
LOUISE E. WALSWORTH.