E. A. POND.

APPARATUS FOR CARBURETING AIR.

No. 50,491. Patented Oct. 17, 1865.

Fig. 3.

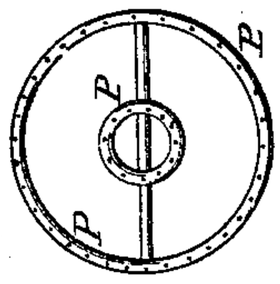


Fig. 2.

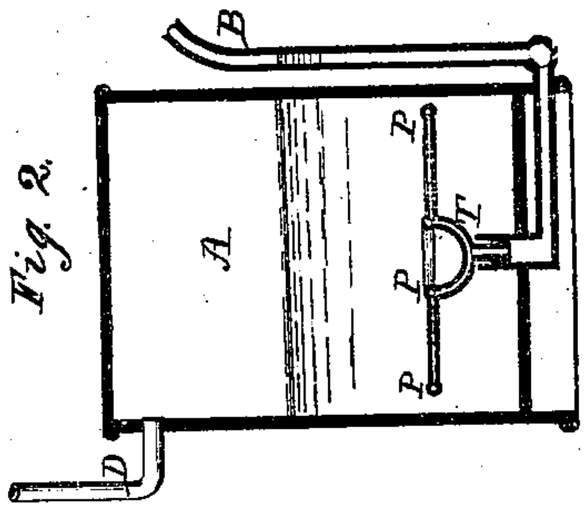


Fig. 4

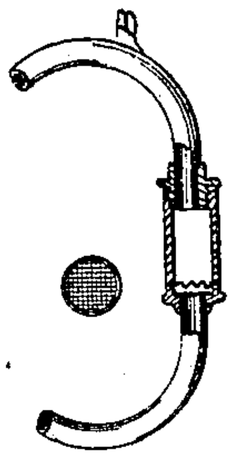


Fig. 10.

Fig. 8.

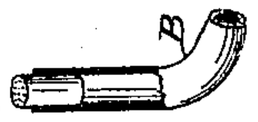


Fig. 9.

Fig. 1.

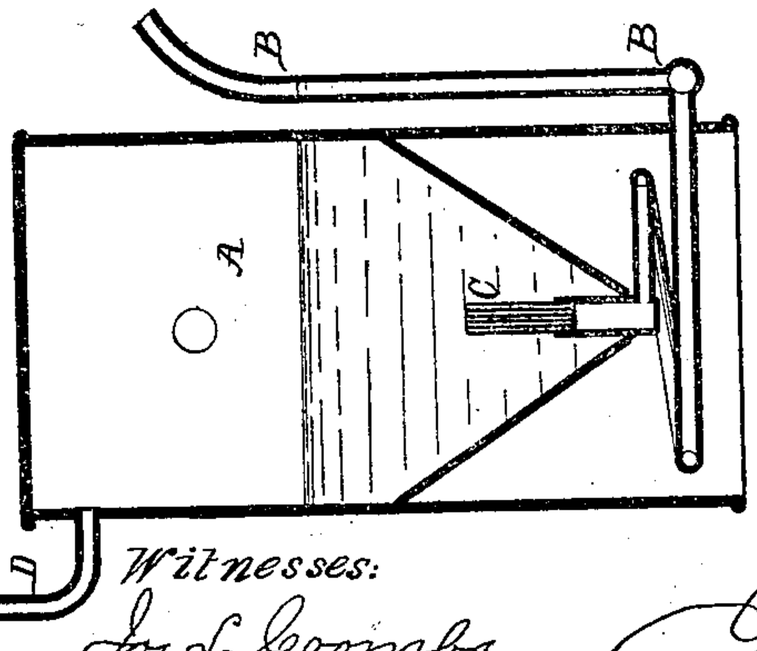
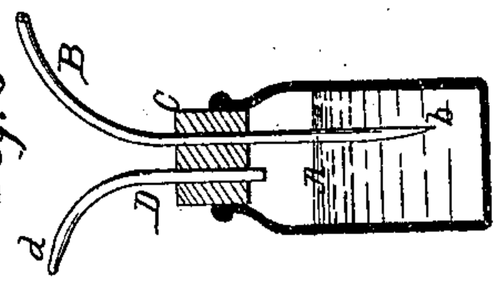


Fig. 7.

Fig. 6

Fig. 5



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UNITED STATES PATENT OFFICE.

ERASMUS ALLINGTON POND, OF RUTLAND, VERMONT.

IMPROVED APPARATUS FOR CARBURETING AIR.

Specification forming part of Letters Patent No. **50,491**, dated October 17, 1865.

To all whom it may concern:

Be it known that I, ERASMUS ALLINGTON POND, of Rutland, in the county of Rutland and State of Vermont, have invented certain new and useful Improvements in Gas-Machines, or Apparatuses for Generating Illuminating-Gas by Charging Atmospheric Air with the Vapor of Hydrocarbon Fluids; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

The invention subject of this patent is based upon the principle which I have discovered, that if air be compressed or condensed and in such compressed or condensed form allowed to enter a liquid of a volatile nature, such as the hydrocarbon fluids, it will suddenly expand and by such expansion absorb or embody the vapors of said fluid and become charged or saturated therewith. If, therefore, air be forced through a tube contracted at its extremity which is submerged in benzine or other hydrocarbon fluid, it will, on issuing at the contracted end of the tube, expand, and in that condition become charged with the vapor of the fluid. Air charged in this manner with the vapor of hydrocarbon fluids produces a gas answering the best conditions for illuminating and heating purposes.

From the statement of the principle of this my invention, it will be understood that there are numerous ways in which it may be carried into effect, and that various simple yet efficient machines involving the same principle may be made at but little cost of construction and almost without liability of getting out of working order.

In the following description of my invention I shall confine myself to such machines or apparatuses the operation of which I have experimentally tested, and which proved successful.

The simplest form of apparatus and most readily tested is represented in sectional elevation in Figure 5. A in said figure is a bottle containing benzine or some other hydrocarbon fluid. B is a tube made of glass or metal, contracted at one of its ends, and secured or packed in the stopper C, in which another tube, D, carrying at one of its ends a burner, *d*, is similarly secured or packed. When the bottle is closed by the stopper the end of the tube B will be submerged in the liquid while the burner *d* will be on the outside of the bottle. If air be now blown through the tube D it will be compressed in the tube in proportion directly to the blast and inversely to the opening at *b* of the submerged end of the tube; but on issuing at the orifice *b* the air will rapidly expand and charge itself with the vapor of the liquid, bubble up through the liquid and collect in the upper part of the bottle, whence it escapes or is forced out through the tube D and burner *d*, where it may be ignited.

Better results may be obtained by using for the injection-tube one the extremity of which is bent, as shown in Fig. 6, and which should be inserted in the bottle so that the jet shall be directed upward through the liquid. Similar results are obtained by a tube shown in Fig. 7, which, instead of being drawn into a small circular opening—that is to say, by gradually diminishing its diameter—is flattened at its extremity so that the terminal opening shall be capillary, or so narrow as to produce the desired degree of compression of the air before issuing from the tube. By a tube thus constructed, however, a larger amount of air may be forced through a given-sized tube.

In Figs. 8, 9, and 10, modifications in the construction of the tube or method of contracting the same are shown and indicated.

In Fig. 8 the tube, instead of being contracted at the submerged end, is closed by means of a plug of rattan or other reed-like wood in which the cellules form small tubes through which the air is forced by the action of the air-pump. The air will issue through these tubular cells or pores of the wood in fine streams, each of which will expand and charge itself with vapor, as before described. In Fig. 9 the tube is closed by means of a porous mineral substance, and in Fig. 10 a number of small capillary tubes are cemented into the end of the air-supply tube B. Small contracted tubes may branch from the main tube at the sides as well as at the ends.

The apparatuses thus far described are exhibited in the drawings in their simplest or laboratory form, so that the principle of the invention may be more readily understood and, if desired, tested.

Obvious modifications would be made in the construction of the apparatus if designed for practical use or as a permanent machine.

In Figs. 1, 2, 3, and 4 I have shown such gas-machines. Fig. 1 represents a vertical section of a machine consisting of a fluid-vessel, A, from the bottom of which rises the end of the air-supply pipe B. This pipe is connected with an air-pump, blast-wheel, or other air-forcing apparatus, operated by spring-power mechanism, weight, or otherwise. It may be coiled, as shown in Fig. 1, or simply bent upward, so as to discharge the air into and through the mass of fluid contained in the vessel. The opening of the pipe may be contracted as shown in Figs. 5, 6, 7, 8, 9, or 10, or, as shown in this instance, it may be closed by a cluster of small tubes, *c*. The air forced through these small tubes is charged with vapor and collected in the upper part of the vessel and forced into and through the pipe D, which may be provided with a suitable burner, *d*, or supply other pipes leading to burners. Fig. 2 represents a modification, whereby the air is more perfectly diffused through the mass of fluid. The air-supply pipe in this instance terminates in two contracted branch tubes, T, which support two concentric horizontal annular pipes, P, (see Fig. 3,) which are perforated with numerous small holes through which the compressed air finally escapes in fine streams but diffused through the mass of fluid. More or less such annular pipes may be used, according to the amount of gas desired to be produced. In Fig. 4 the air-supply pipe is shown provided with a wire-gauze or perforated plate partition, W, the effect of which is to divide the column of air into fine streams, to more thoroughly pervade the liquid.

Having thus fully described my invention, and the manner in which the same is or may be carried into effect, what I claim is—

1. The method herein described of charging atmospheric air with the vapor of hydrocarbon fluids by the discharging the air through contracted openings into the mass of fluid, substantially as herein shown and described.

2. The method herein described of charging atmospheric air with the vapor of hydrocarbon fluids by dividing the column of air and discharging the same into the liquid in small streams, substantially as hereinbefore described and shown.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

E. A. POND.

Witnesses:
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