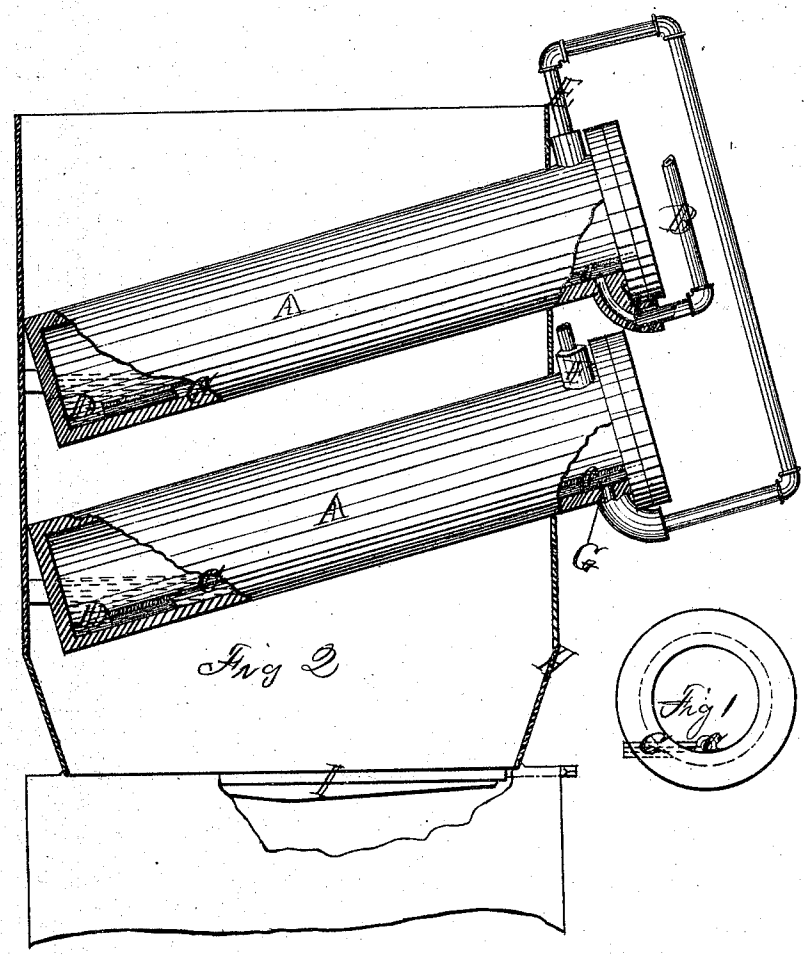
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Manf. Gas.

No. 107,809. Patented Sept. 27. 1870.



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ERASMUS A. POND, GOLDSBURY H. POND, AND MARK S. RICHARDSON,
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IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATION-GAS.

Specification forming part of Letters Patent No. **107,809**, dated September 27, 1870; antedated September 24, 1870.

Be it known that we, ERASMUS A. POND, GOLDSBURY H. POND, and MARK S. RICHARDSON, of Rutland, county of Rutland, State of Vermont, have invented certain new and useful Improvements in the Mode of Making Gas and Gas-Retorts, of which the following is a specification:

The nature of our invention and improvements in gas-retorts and making gas consists in providing gas-retorts with a bath of fusible or fused metal and a descending pipe, terminating in the metal-bath, for the purpose of conducting or conveying steam into the bath of fused metal to be superheated and decomposed, so as to unite and mix the steam with the gas generated in the retort.

We make our gas-retorts with a recess formed in the bottom, when they are set horizontal; but when set on an inclination, the lowest part of the retort forms a well or recess; or when the common retorts are used, which are already set, an iron or clay tank of sufficient capacity can be placed in the closed end, into which is placed a sufficient quantity of tin or lead, or both, mixed as in common solder, or any other metal that melts at a low enough temperature to be used in gas-retorts and that will decompose steam when melted, to cover the orifice of a pipe leading to it several inches, thus forming a metallic bath, through which all the liquid or gaseous material is passed. Into the pipe leading to the bath is introduced a jet of steam, superheated to as near a red heat as possible, and regulated by a stop-cock, so as to mix it in suitable quantities with the other material. The superheated steam, in passing through the red-hot metal-bath, is brought into instantaneous and close contact with the metal, and is decomposed or resolved into the two gases, hydrogen and oxygen, which, in their nascent state, take up or combine with other gases, leaving no residue. The melted metal of the bath would soon be oxidized if carbonaceous material was not in contact with or resting upon its surface. When the liquid hydrocarbons, fats, oils, or resins are used, they supply sufficient carbon to take up the oxygen; but, in using other material, coal, coke, or sawdust is thrown in onto the surface of the metal, which takes up the oxygen as carbonic oxide, which passes over with the other gases and leaves the metal-bath in its normal condition. Two or more retorts thus arranged, and the baths charged with the requisite amount of metal, are heated up to a bright red heat, the superheated steam let in and passed through the bath of the first retort and over to the conducting-pipe of the second retort, so as to receive the gases from the other retorts, or the liquid material, such as the hydrocarbons, fats, or oils, into it, and passing on together through the second metal-bath, and combining with the hydrogen and oxygen, which deprives them of all the tar or condensable matter, the hydrogen protecting the material used from loss of its gaseous properties or illuminating qualities.

When coal or solid substances are used to make gas from, it is charged into the first retort that receives the superheated steam, and the coal or other material, lying upon the surface of the metal-bath, takes up the oxygen and passes it over with the other gases, and the tar and material, which, in the ordinary mode of making gas, is lost for this purpose, is passed over into the second metal-bath, where it is decomposed and combined with the other gases, thereby producing from all the material passing over from the coal good illuminating-gas.

When the illuminating qualities are not required, but it is used for heating purposes, it is only necessary to let in a larger volume of superheated steam, which gives a larger amount of hydrogen and oxygen.

In order to enable any one skilled in the art to make and use our gas and gas-retorts, the following is a full and exact description of the same, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is an elevation of the front or head of the retort. Fig. 2 is an elevation and plan of setting, and view of the metal bath.

A A, Fig. 2, represent the retorts. B is the receiving-pipe for the superheated steam. C C are the conducting-pipes, either loose or formed in the bottom of the retort, and ending an inch and one-half from the bottom or closed end of the retort, the cover on the head

or front end, when in place, forming a tight joint on that end of the pipe. D D are the metal-baths, of the requisite depth to cover the lower end of the conducting-pipes C C several inches. E is the exhaust of the first retort and the receiving-pipe of the second, taking all the gases formed in the first retort to the bath D of the second retort. F is the exhaust-pipe of the second retort, through which the gases are conducted to the gasometer. G is the supply-pipe for liquids used for making the gas of. H is the fire-front and frame, to hold the retorts in place; I, the grate-bars.

In making gas from any of the various substances, the baths D D are first charged with the requisite amount of metal, such as tin, lead, or both, mixed as in solder, or any other metal that melts at a low enough heat, and that will decompose steam when melted, or any alloys of the metals that will answer the same purpose. Then the retorts A A are heated up to a bright-red heat, and, if coal is used, the upper retort, or the one that first receives the superheated steam, is charged with it, the charge resting upon the metal of the bath. The covers are put on and the superheated steam let in through the pipe B, and the gas, as it is formed, passes over into the next retort through the pipe E and through the bath D, with the hydrogen and oxygen, which takes up all the tar, and prevents the deposit of carbon by combining with it, and passes it over in the gaseous form, thereby giving a much larger volume of good illuminating-gas from a given amount of material or coal.

When the liquid hydrocarbon, oils, fats, or resins are used for the production of gas, they are introduced into the conducting-pipe C through the supply-pipe G, from a reservoir placed convenient to the retorts, and are passed through the bath D, and subjected to the same decomposition and combinations as the coal-gas.

The carbon, or a portion of it, from the liquid material combines with the oxygen of the steam and passes over with the other gases, leaving the metal of the bath in constant working condition.

What we claim as our invention and improvements in gas-retorts provided with a bath of fusible or fused metal is—

1. A pipe descending and terminating in the bath of fused metal or metals, for the purpose of conducting and conveying steam into the bath of fused metal, for the purpose of superheating and decomposing the steam, to mix and unite with the gases generated in the retort.

2. Mixing steam with illuminating-gas by means of a metal-bath, in the process of generation in the retort, substantially as described, for the purpose set forth.

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Witnesses:
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