2 Sheets--Sheet 1.

H. J. SURMON.

Gas-Apparatus.

No. 168,539. Patented Oct. 5, 1875.

Fig. 1.

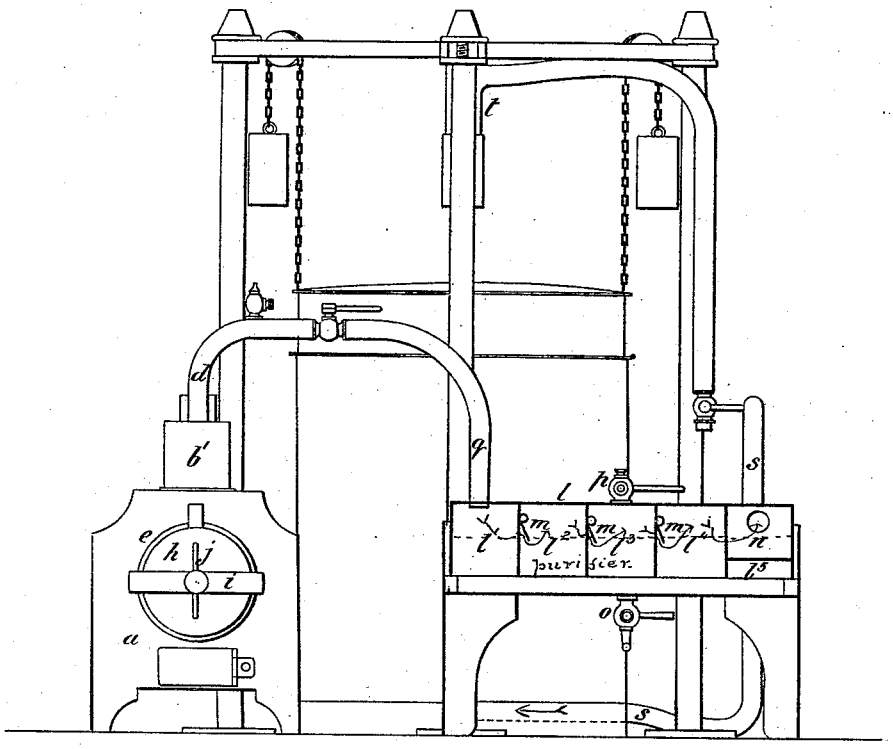


Fig. 2.

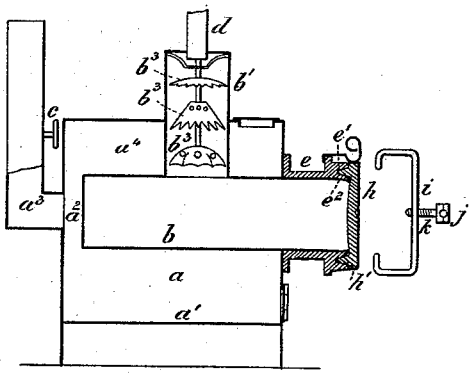
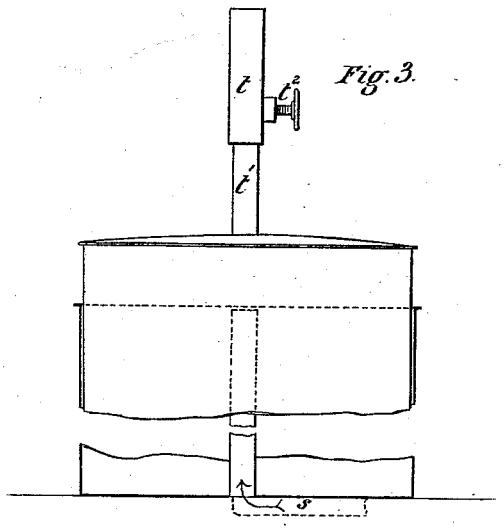


Fig. 3.



Attest
Charles Thurman.
C. W. Dyer

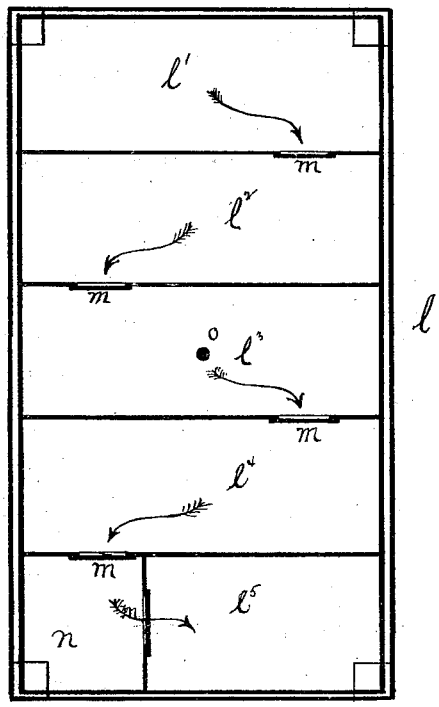
Inventor:
Henry James Surman
by Geo. W. Dyer
Atty.

2 Sheets--Sheet 2.

H. J. SURMON.
Gas Apparatus.

No. 168,539. Patented Oct. 5, 1875.

Fig. 4.



ATTEST.
Chas. Hillman
R. F. Dyer

INVENTOR.
Henry James Surmon.
by Geo. W. Dyer.
Atty.

UNITED STATES PATENT OFFICE.

HENRY JAMES SURMON, OF BELVEDERE, ENGLAND.

IMPROVEMENT IN GAS APPARATUS.

Specification forming part of Letters Patent No. **168,539**, dated October 5, 1875; application filed June 3, 1875.

To all whom it may concern:

Be it known that I, HENRY JAMES SURMON, of Belvedere, Kent, England, gentleman, have invented Improvements in Apparatus for Manufacturing Gas, of which the following is a specification:

My said invention relates to apparatus of novel construction, whereby I am enabled to effect the manufacture of gas for illuminating and heating purposes in a very advantageous manner.

My improved apparatus is constructed as shown in the accompanying drawing, which I will now proceed to describe.

Figure 1 is a front elevation, partly in section, of my improved apparatus. Fig. 2 is a longitudinal section of the retort and furnace. Fig. 3 is a side elevation, partly in section, of the gas-holder in Fig. 1; and Fig. 4 is a horizontal section of the purifier on the plane of the connecting-doors.

Like letters indicate the same parts throughout the drawing.

The stove or furnace *a*, wherein the retort *b* is placed, is preferably built of brick-work, and with its bottom a^1 arranged very close to the under side of the retort. The latter is preferably made of iron, and would be liable to rapid destruction by the heat of the furnace but for the arrangement herein described, whereby its destruction is, in a great measure, prevented. I construct the stove *a* with a flue, a^2, at the back of the retort, leading to the chimney a^3, and which is so arranged, in connection with the chamber a^4 surrounding the retort, as to cause the flame to travel around the same and ascend the said flue. The chimney is provided with a regulator consisting of three perforated plates, which cause a strong draft, and may be turned or adjusted by means of a handle, *c*, to act as a damper. The said retort is made T-shaped, as clearly shown in Fig. 2. It is placed in the furnace or stove with the vertical stem or branch b^1 upward, the said stem being provided with a flange, to receive the ascension-pipe *d*. The inside of this vertical stem is provided with a series of cups or bowls, b^3. The tar that rises with the gas from the retort is caught by these cups or bowls, and, running down their sides, falls back into the retort, and by this contrivance the tar, which in the ordinary apparatus for making gas enters the hydraulic main, is compelled to return into the hottest part of the retort, and is therein regenerated. I am, therefore, enabled to dispense with the hydraulic main in my improved apparatus. In some instances I fit inside the retort, at the bottom of the aforesaid stem or branch b^1, a portable sliding frame, constructed of angular iron bars, arranged horizontally, and which, by preventing the passing of the tar and other matters with the gas to the said bowls, protects them from corrosion. The body or horizontal portion of the said retort may be cylindrical, as shown, or may have an oval or other suitable transverse sectional form. The front of the said retort *b* is provided with the mouth-piece *e*, which is secured to the retort by bolts passed through flanges, or by other suitable fastenings. The said mouth-piece is constructed with a flange, e^1, in which is formed a circular V-shaped groove or channel, e^2. The cover *h* has a V-shaped rib or projection, h^1, formed to enter and fit the said groove or channel, and when the cover *h* is in place on the mouth-piece, this groove and projection will make the joint perfectly tight without luting or cement. Over the said mouth-piece I place a clamp-bar or brace, *i*, which is fitted with a lever, *j*, and screw *k*, or with a ratchet-wheel or other suitable mechanism for securing the cover *h* upon the mouth-piece, and permitting the ready removal and replacing of the said cover. This bar *i* is shown detached in Fig. 2.

My improved apparatus is provided with a purifier, *l*, constructed with a series of chambers, l^1 l^2 l^3 l^4 l^5, which must be partly filled with lime and water. Each of these chambers has a self-acting door, *m*, supported on hinges, and so arranged that it is partially below the surface of the lime and water. Inside the chamber l^5 I form an inner chamber or compartment, *n*, filled with a mass of small iron wire, saturated with sal-ammoniac. The purifier is also provided with two cocks, *o p*. The lower cock, *o*, serves the purpose of admitting air to the said chamber, while the upper cock, *p*, serves as an outlet for the same. These cocks afford the means for reviving the properties of the materials in the said cham-

bers, and therefore economize the working of the purifier. The above-described iron wire and sal-ammoniac will be found far superior to the oxide of iron commonly used in gas apparatus. The inlet-pipe *q* is provided with a self-acting door or valve, which prevents the return of any gas from the purifier through the said pipe. The said purifier is connected by pipes *s* to the gas-holder. The latter is constructed of sheet-iron or other suitable material, and may have any convenient capacity. It has a telescopic outlet-pipe, *t* t^1, at the top, instead of the usual pipe at the bottom, for conducting the gas to the service-pipes. The outer part *t* of this pipe is provided with a screw, t^2, whereby the inner part t^1 may be held fast, and the holder supported at any height, so that when no gas is being used there will be no pressure in the holder, and, consequently, the loss or waste of the gas by leakage from the holder and the pipes and connections will be prevented. Instead of this screw, other convenient means for clamping or locking the telescopic pipe, and thereby supporting the holder, may be employed.

I claim as my invention—

1. In combination, the retort *b*, the branch b^1, and the series of cups or bowls b^3, constructed and arranged substantially as described.

2. The purifier *l*, constructed with compartments or chambers l^1 l^2 l^3 l^4 l^5, provided with self-acting doors *m*, and with the inner chamber *n*, as herein described, and for the purpose specified.

3. The method or process of purifying gas by the use of iron wire saturated by sal-ammoniac, in the purifier of a gas apparatus, for the purpose specified.

4. The apparatus for manufacturing gas, consisting of the furnace *a*, retort *b*, purifier *l*, and gas-holder, above described, and their fittings and connections, as shown, or the equivalents thereof, constructed, combined, and operating as herein set forth.

HENRY JAMES SURMON.

Witnesses:
WM. ROBT. LAKE,
HENRY JAMES NOON.