T. S. C. LOWE.

Improvement in Apparatus for Generating Gas and Heating Dwellings.

No. 130,381. Patented Aug. 13, 1872.

Fig 1.

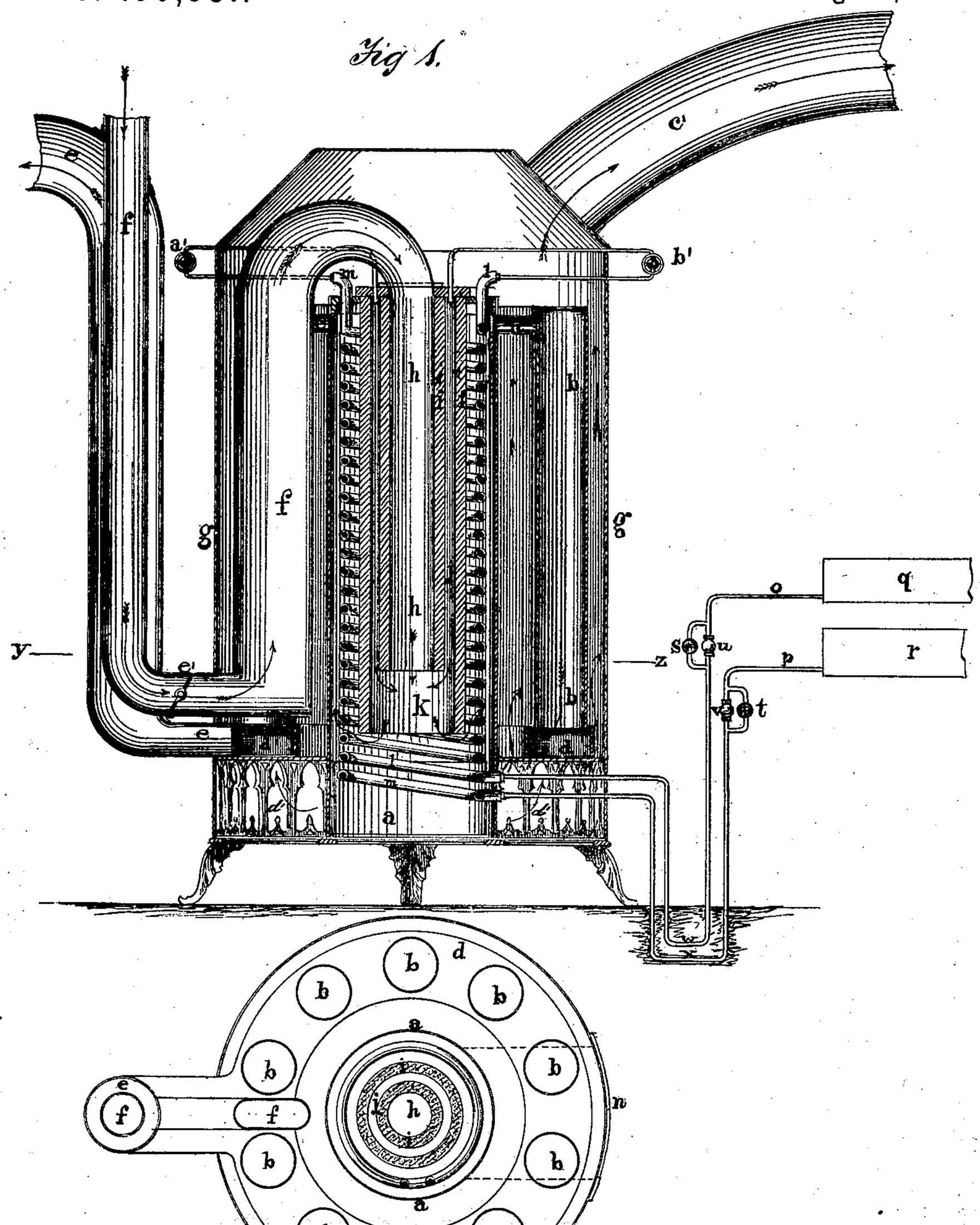

Fig 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

THADDEUS S. C. LOWE, OF NORRISTOWN, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR GENERATING GAS AND HEATING DWELLINGS.

Specification forming part of Letters Patent No. **130,381**, dated August 13, 1872.

Specification describing a combined Gas-Generating Apparatus and Heater for use in dwellings and other buildings, invented by THADDEUS S. C. LOWE, of Norristown, Montgomery county, Pennsylvania.

In the drawing, Figure 1 represents a vertical section of the complete apparatus, and Fig. 2 a horizontal section of the same on the line *y z* of Fig. 1.

a is a central wrought-iron cylinder and radiator, closed at the top. *b b* are a series of wrought-iron radiators, connected at their top ends with the cylinder *a*, into which they open by separate short tubes *c*. The radiators *b* are connected at their lower ends with the annular space or smoke-box *d*. *e* is a smoke-pipe or draft-flue, connected with the space in the annular box *d*, and leading thence to a chimney-flue. *f* is a cold-air flue, contained for some distance inside of flue *e*, as shown. Passing out of the flue *e* the flue *f* enters the casing *g*, which covers the radiators *a* and *b* and passes upward and connects with the inner space *h* of a regenerating-retort, *i*, at the top of this space. This retort *i* may be constructed of cast-iron or other suitable material, in the form of a double-cylinder, with a small annular space, *j*, between the shells of the two cylinders. The space *j* opens at its lower end into the mouth *k* of the retort *i*, where combustion of the gases takes place. The outer shell of the retort *i* extends some distance lower down than its inner shell and forms the mouth *k*. The retort *i* is suspended by a flange resting on the head of the cylinder *a*, as shown. *l* and *m* are distinct coils of wrought-iron pipe for generating gases. *n*, Fig. 2, is a door communicating with the lower end of the chamber containing the coils *l* and *m*. *o* and *p* are tubes leading to the lower end of these coils. *s* and *t* are cocks. *u* and *v* are check or safety valves. *q* and *r* are tanks for holding oil and water, respectively. *w* and *x* are bends in the tubes *o* and *p*, extending below the point at which they enter the coils *l* and *m*. *c'* is a flue for conveying heated air into apartments to be warmed, and *d' d'* are open spaces in the base of the apparatus for admitting the cold air to be heated. *e'* is a damper in the flue *f* for regulating the admission of air for combustion in the mouth *k* of retort *i*.

In order to put this apparatus into operation the damper *e'* is closed and a light wood fire is built under the coils *l* and *m*, the wood being introduced through door *n* into a tight iron box in the base of the heater. The flame from the burning wood rises and heats the coils *l* and *m* and the regenerating-retort *i*. After a few minutes, when these coils have become sufficiently heated, the cock *s* is opened, and the oil, passing down the pipe *o*, enters the coil *l*, where it is immediately converted into gas or vapor, which fills this coil, and the gas-cock *b'* is then opened and the product, which by this time has been quite or nearly converted into a permanent gas, enters the outer annular chamber *j* of the retort *i* and passes down to the combustion-chamber *k*, which is the mouth of retort *i*, where it ignites and burns. The valve or damper *e'* is now opened and the door *n* is closed, thus causing the air for combustion to pass through the heated flue *f* before it mingles with the gas in the combustion-chamber *k*, thus heating the air for combustion by means of the outgoing waste heat after the same has left the heater. The flame arising from the combustion of the united air and gases rolls gently out of the mouth of the chamber *k* and rises, passing around and over the coils *l* and *m* and against the shell of the cylindrical retort *i*, intensely heating both. The cock *t* may now be opened and water admitted through the pipe *p* to the coil *m*, where it is converted into steam, and, further, into mixed hydrogen and oxygen in the form of highly-heated vapor, and, upon opening cock *a'*, this vapor enters into chamber *j* and there mixes with the hydrocarbon gas or vapor. Both then pass down toward the combustion-chamber *k* in a direction opposite to that of the escaping waste products of combustion, and are thus further heated and converted into a mixture of carbonic oxide and hydrogen, greatly increasing the volume of gases and intensity of the heat in the combustion-chamber *k*, and allowing a great reduction in the amount of oil required for combustion.

A branch pipe, not shown, may be attached to the upper end of the coil *l* containing the hydrocarbon gas, and the gas may be drawn off through it for illuminating purposes.

One of the important features of my invention consists in placing the tanks containing the water and oil considerably lower than the

point at which the gases are drawn from the generating-coils, or equivalent tubes or retorts, as the case may be, thus preventing the materials from flowing into the coils when the apparatus is cold, and obviating any danger and inconvenience which might otherwise result from the overflow of the materials into the apparatus or apartment wherein the apparatus may be placed.

Another important feature consists in placing these tanks sufficiently high above the points where the materials enter the generating-coils to give the requisite pressure for forcing the gases wherever required; also, in causing the pipes *o* and *p* to drop down below and then rise to the point where the materials are carried into the generating-coils, or tubes, or retorts, as the case may be.

The objects of this mode of construction and arrangement are to prevent any gas or vapor from rising in the supply-pipes *o* and *p*, and to allow the gases and vapors to hold back the raw materials until the same are wanted to supply further gas, as the gas generated is drawn off for use.

In place of the coils *l* and *m* straight tubes, retorts, or any other mode of vaporizing the oil and water may be employed; but I prefer the use of the coils, as described.

The above-described apparatus is now in operation, and all the results herein described are fully obtained.

These heaters are equally adapted to the use of the ordinary street or coal gas or inflammable gas of any kind, and when such gas is used I prefer to attach the pipe supplying the same to the pipe *o*, (which is detached in such cases from the oil-tank *q*,) in order to pass the gas through the coil *l* and heat and use it in conjunction with the gaseous products of water; or gases such as last referred to may be used with my apparatus without being first passed through coil *l*.

Having thus described my invention, I claim—

1. The double retort *i* for decomposing the vapors of water mixed with carbonaceous vapors and gases and for heating the air for combustion by the heat which arises from the combustion of the gases produced, substantially as set forth.

2. The coils *l* and *m*, or their equivalent tubes or retorts, in combination with the double retort *i*, all constructed, arranged, and operating in the manner and for the purpose substantially as set forth.

3. The retort *i* in combination with the coils *l* and *m*, their pipes *o* and *p* with the bends *w* and *x*, and cocks and safety-valves *s* and *t*, *u* and *v*, and the tanks *q* and *r*, for oil and water, respectively, all constructed, arranged, and operating in the manner and for the purpose substantially as set forth.

4. The air-supply pipe *f*, arranged within the smoke-pipe *e*, and provided with the regulating-damper *e'*, in combination with the retort *i*, in the manner and for the purpose substantially as set forth.

5. The radiators *b* and smoke-box *d*, in combination with the smoke-pipe *e*, air-supply pipe *f*, and casing *g*, all constructed, arranged, and operating in the manner and for the purpose substantially as set forth.

T. S. C. LOWE.

Witnesses:
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