2 Sheets--Sheet 1.

M. W. KIDDER.

Apparatus for Manufacturing Illuminating Gas.

No. 154,552. Patented Sept. 1, 1874.

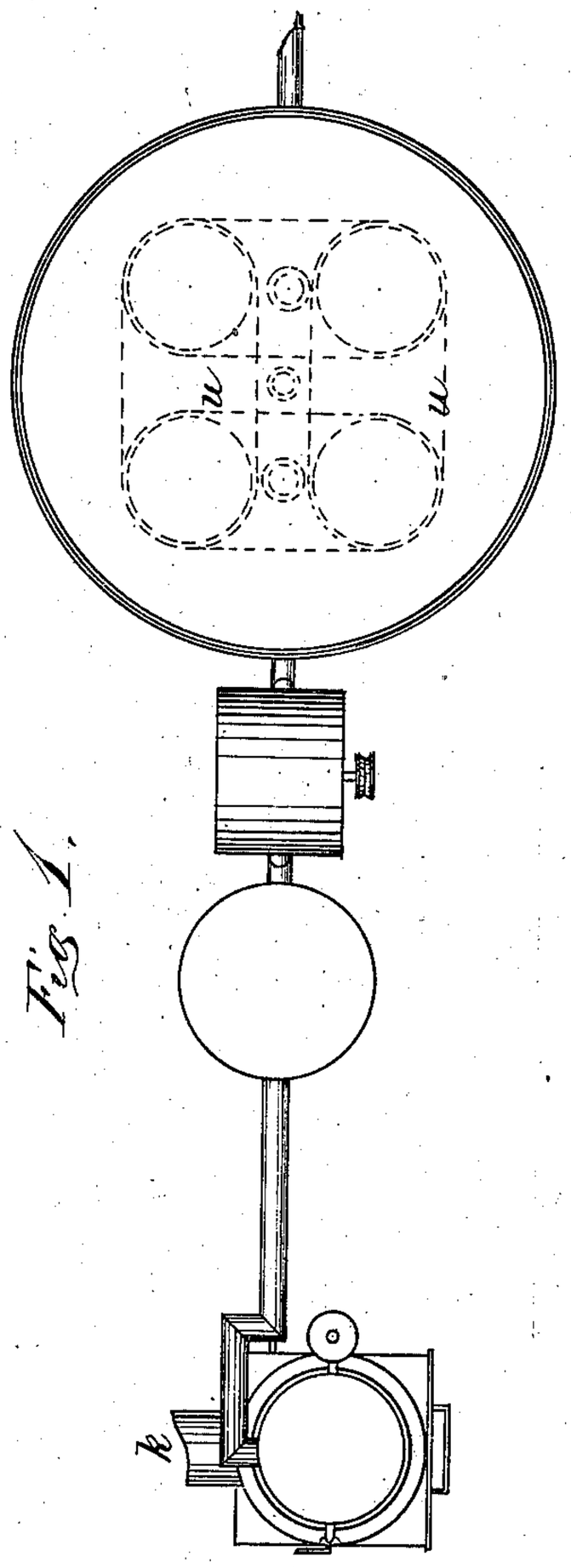

Fig. 1.

Witnesses:
Alban Andrén
Person Nays

Inventor:
Moses W. Kidder

2 Sheets--Sheet2.

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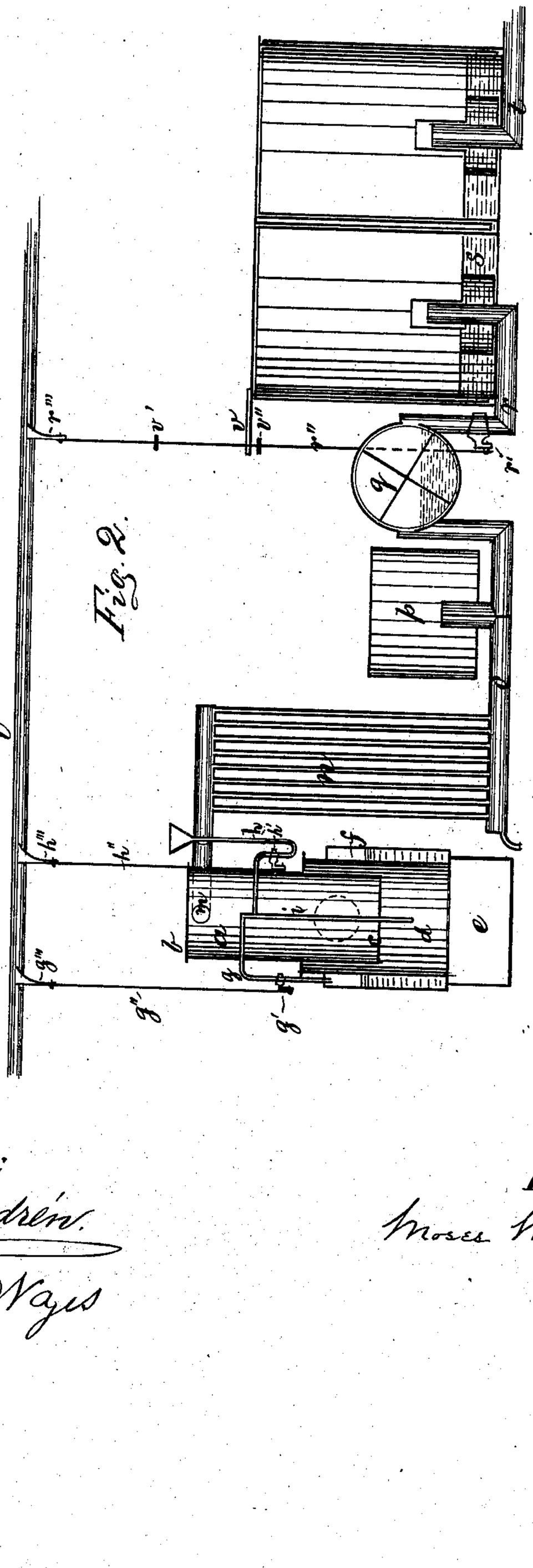

Fig. 2.

WITNESSES:

Alban Andrén.

Person Nyes

INVENTOR:

Moses W. Kidder

UNITED STATES PATENT OFFICE.

MOSES W. KIDDER, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS RIGHT TO PERSON NOYES, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR MANUFACTURING ILLUMINATING-GAS.

Specification forming part of Letters Patent No. **154,552**, dated September 1, 1874; application filed June 24, 1874.

To all whom it may concern:

Be it known that I, MOSES W. KIDDER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Gas Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention is as follows: I substitute for the ordinary horizontal gas-retort a vertical one, cylindrical in form and of suitable size, being closed at the top by a movable cover, and open at the lower end. The retort is made to rest by means of a flange upon the top of the furnace. The lower end of the retort projects into the furnace to a point about twelve inches above the grate, and the retort is so arranged in relation to the grate that, as the coal is consumed above the grate, more is automatically supplied from the retort.

The cover of the retort is removed when charging the retort with coal, after which it is either luted on or packed with fusible metal.

The retort is provided near the top with a pipe for conducting the gas as it is produced to the purifiers, and also with a pipe for the introduction of steam and hydrocarbon oils, &c., that passes down the center of the retort to a point a little below the lower end of the said retort, by which the steam and hydrocarbon oils are delivered in the midst of the furnace fire.

The steam is produced from an annular boiler surrounding the furnace, or other suitable steam-generator. The hydrocarbons are admitted to the furnace through a pipe connected to the steam-pipe.

The gas produced in this apparatus is drawn from the purifiers by means of a rotary pump partly filled with heavy petroleum oils, or similar liquids, in place of water, and is forced to the gas-holder, where it may be made to pass through wicking saturated with gasoline or light naphthas, whereby the gas becomes fully charged with the vapors of the gasoline or naphtha, by which its illuminating power is materially increased. The gas-pump may be moved by steam from the generator connected with the furnace, or by means of a weight or otherwise, as may be desirable.

Ordinary coal-gas has heretofore been used to some extent for heating and cooking purposes, &c., and in these operations it becomes necessary to combine a portion of atmospheric air, so as to consume the excess of carbon.

With my improved apparatus, by closing the hydrocarbon-pipe, the gas produced is eminently suited for all heating purposes, as no deposit of carbon can occur, and in cooking meats no disagreeable flavor can be imparted by imperfect combustion of the gas.

The cost of gas for heating purposes produced by this method will be so far reduced as to bring it into general use as a substitute for other fuel.

With separate gas-holders both heating and illuminating gas can be produced by the same apparatus.

For the purpose of preventing the gas-holder from overfilling, I have arranged on the main supply-pipe to the gas-holder a valve or cut-off, that is closed automatically by means of a projection on the top of the gas-holder, and a suitable connecting mechanism to a lever or handle on the cut-off. By means of a rock-shaft and suitable levers, with intermediate connecting mechanisms to valves or cut-offs on the steam and hydrocarbon pipes, or equivalent devices, I am able to shut off the supply of steam and hydrocarbons automatically at the same time the gas is shut off from the gas-holder. As the gas-holder descends when the gas is drawn from it, it causes the supply-valve from the gas-pump to be opened automatically, as well as the valves or cut-offs on the steam and hydrocarbon pipes, by which arrangement all danger of overfilling and explosions is entirely obviated.

Furnaces or stoves for dwelling-houses constructed upon this principle could be used to perform their usual office of heating in the ordinary way simply by closing the steam, hydrocarbon, and gas supply pipes, and by open-

ing these pipes the gas would be produced and drawn to the holder.

My invention is operated as follows: After the fire is kindled on the grate, I introduce anthracite or semi-bituminous coal through the top of the retort, until it is nearly full, when I close the top of the retort, and increase the fire until the steam is generated, which, as well as the hydrocarbons, is then admitted into the furnace. A rotary pump draws the gas produced in the retort through the scrubbers and purifiers, and forces it into the gas-holder. Charcoal, peat, sawdust, chips, and the like may be employed, or mixed with the coal, if desired.

On the drawings, Figure 1 represents a ground plan, and Fig. 2 represents a central longitudinal section of my invention.

Similar letters refer to similar parts wherever they occur on the different parts of the drawing.

a represents the retort, that is covered at the top with a cover, *b*, that can be removed for the admission of the fuel to the retort. The retort *a* is open in its lower end, *c*, that projects into the furnace *d*, as shown. *e* represents the ash-pit in the ordinary way. *f* represents the steam-boiler surrounding the furnace *d*, from which it obtains the heat necessary to convert the water into steam. From the steam-generator *f* leads a pipe, *g*, into the retort *a*, where it is joined by another pipe, *h*, through which the hydrocarbons are admitted. The pipes *g* and *h* are joined to a vertical pipe, *i*, that terminates at a point between the grate in the furnace *d* and the lower end of the retort, through which vertical pipe the steam and hydrocarbons are simultaneously admitted to the burning fuel in the furnace. *k* represents a chimney leading from the furnace *d*, through which the products of combustion in the said furnace may escape when it is not desirable to produce gas. The steam-pipe *g* is provided with a valve or cut-off, *g'*, that is connected to a rod, *g''*, and a lever, *g'''*, attached to a rocking shaft, *l*. The hydrocarbon-supply pipe *h* is, in a similar manner, provided with a valve or cut-off, *h'*, and operating-rod *h''*, the upper end of which is jointed to a lever, *h'''*, attached to the rock-shaft *l*. The gas produced in the retort *a* passes through a pipe, *m*, in the upper end thereof to the scrubber or cooler *n*, from whence it passes through the pipe *o* into the purifier *p*, from which it is drawn by the rotary pump *q*, and forced through the main pipe *r* into the gas-holder *s*. *r* is the main inlet-pipe to the holder, and *t* is the main outlet-pipe therefrom. The lower part of the gas-holder contains gasoline or light naphtha, upon which floats cotton-wicking *u u*, (shown in dotted lines in Fig. 1,) so arranged that, as the gas enters the holder through the inlet *r*, and as it escapes through the outlet *t*, it must pass through the wicking, and very near the surface of the naphtha, by which means it becomes fully charged with the vapor of the naphtha, and most capable for illumination. The main inlet-pipe *r* is provided with a valve or cut-off, *r'*, located between the pump *q* and the holder *s*, as shown in Fig. 2, which valve is connected by means of a rod, *r''*, to a lever, *r'''*, attached to the aforesaid rocking-lever *l*, that may be made to rest in suitable stationary bearings. To the movable part of the gas-holder *s* is attached a projecting arm, *v*, that comes in contact with projections *v' v''* on the rod *r''* as the holder rises and falls. This latter arrangement constitutes an automatic regulator to prevent the gas-holder from being overfilled, and also admits the gas automatically to the holder when empty, or nearly so.

As the movable part of the gas-holder rises, I have it so arranged that when the holder is almost filled the projecting arm *v* strikes the projection *v'* on the rod *r''*, and thereby closes the valve or cut-off *r*, thus preventing any more gas being forced into the holder. As the holder descends to its lowest point, the projecting arm *v* comes in contact with the projection *v''* on the rod *r''*, whereby the valve or cut-off *r* is opened, so as to refill the holder, as before. The levers *r'''*, *g'''*, and *h'''* being attached to one and the same rocking shaft *l*, it follows that the valves *r*, *g*, and *h* are operated automatically together.

I do not, however, confine myself to this particular arrangement and construction of the automatic regulating apparatus, as equivalent means may be used for the same purpose to the same advantage.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The valve *r'* in the main leading from the retort to the holder, and the valves *g'*, *h'*, and their connecting mechanism, the rods *r''* *g''* *h''*, levers *g'''* *h'''* *r'''*, shaft *l*, and projections *v v' v''*, for the purpose set forth.

2. The vertical retort *a*, open at its lower end, and terminating in the furnace *d*, in combination with the eduction-pipe *m*, as and for the purpose set forth.

3. The combination of the annular boiler *f*, furnace *d*, and retort *a* with the steam-pipe *g* and hydrocarbon-pipe *h*, as and for the purpose set forth.

4. The combination, with the retort *a*, furnace *d*, and annular boiler *f*, of the eduction-pipes *k* and *m*, as and for the purpose set forth and described.

In testimony that I claim the foregoing as my own invention, I have affixed my signature in presence of two witnesses.

MOSES W. KIDDER.

Witnesses:

ALBAN ANDRÉN,

PERSON NOYES.