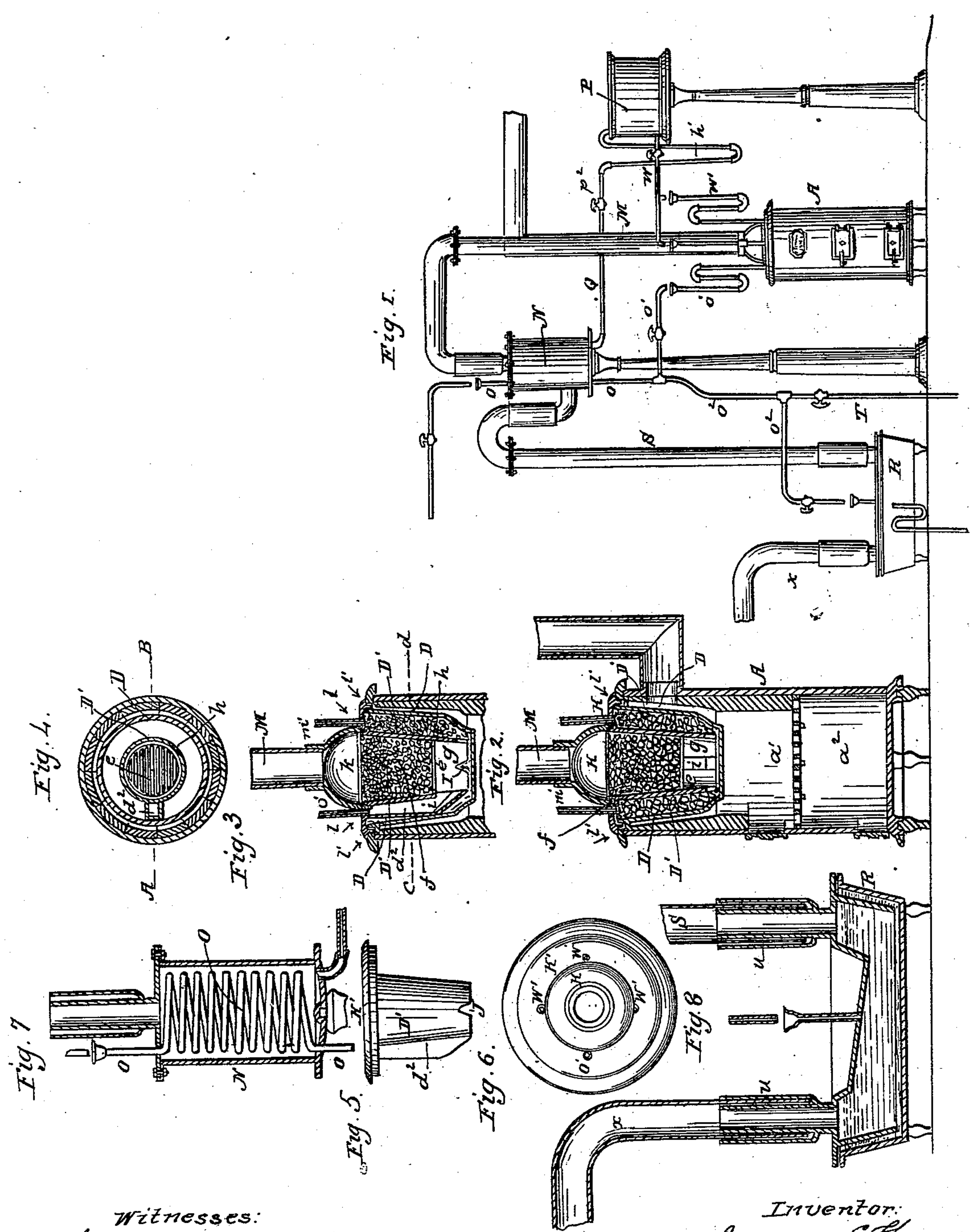


J. E. THOMSON. Making Oil and Water Gas.

No. 36,627.

Patented Oct. 7, 1862.



Witnesses:
Walpole Forbush
Levin

Inventor:
J. E. Thomson
 By *E. B. Forbush atty.*

UNITED STATES PATENT OFFICE.

JAMES E. THOMSON, OF BUFFALO, NEW YORK.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 36,627, dated October 7, 1862.

To all whom it may concern:

Be it known that I, JAMES E. THOMSON, of the city of Buffalo, county of Erie, and State of New York, have invented a new and improved apparatus for the manufacture of illuminating-gas from petroleum and water, cannel coal, rich bituminous coals, schists, tar, and crude coal-oils, or any fluid hydrocarbon and water; and I do hereby declare that the following is a full and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a side elevation of my improved apparatus. Fig. II is a vertical section of the generator. Fig. III is a vertical section of the compound retort on line A B of Fig. IV. Fig. IV is a cross-section of retort on line *c d* of Fig. III. Fig. V is an elevation of the inner retort. Fig. VI is a top plan of generator. Fig. VII is a vertical section of condenser. Fig. VIII is a longitudinal section of the washer.

Letters of like name and kind refer to like parts in each of the figures.

The generator is represented at A, and includes the furnace part *a'*, which is made of cast-iron and lined with fire-brick, the ash-pit *a*², and the compound retort D and D'. The compound retort is composed of the outer retort, D, which may be made of cast-iron, clay, or other suitable material, and the inner retort, D', which is also made of cast-iron, clay, or other suitable material. (Both may be made cylindrical, conical, or other suitable form.) The inner retort is placed within the outer, so that an annular chamber is formed in the outer, as shown at *h*. There is a grating, *e*, placed in the inner retort, which supports coke or charcoal thereon and divides the retort into two chambers—to wit, an upper chamber, *f*, and lower chamber, *g*. The inner retort, D', has a pipe or chamber cast thereon, as shown at *d*², which opens into the lower chamber, *g*. It also has a flange, K', which forms a cover to the outer retort. At the bottom of this pipe a piece of smooth or polished fire-brick is placed at a high angle, as shown at *i*. Water from the condenser (or other source) is conducted through this pipe, which falls upon the smooth polished and hot surface of this fire-brick and glances therefrom into the chamber

g. There are arched cavities made in the bottom of the inner retort, as shown at J, which serve as channels or communications between the outer retort, D, and inner retort, D'.

At K is shown a cover, which is fixed over the inner retort by lead joint, as shown at *l* in Figs. II and III. The flange of the inner retort forms a cover to the outer retort with lead joint, as shown at *l'*. The eduction-pipe M is attached to the cover by a stationary rust-joint, *m'*, which pipe connects with the condenser N. The condenser N contains a coil of pipe or tubing of iron or lead or other suitable material, as shown at O, through which cold water passes from a reservoir. This pipe branches off below the condenser into two parts, one of which, O', opens into the pipe *d*² and supplies water to the inner retort, and the other, O², supplies water to the washer. The condenser is connected to the petroleum-tank P by means of the pipe Q, which is provided with a siphon-valve, *p'*, and stop-cock *p*². The condenser is also connected with the washer R by means of the eduction-pipe S.

T is a waste-pipe. All the parts of the apparatus, with the exception of the rust-joints and lead joints at the top of the generator, are connected by means of water-joints, (represented at *u* in Fig. VIII,) which will instantly yield to any increase of pressure above the column of water which they contain, which need not exceed eighteen inches.

V is a siphon waste-pipe connected with the washer.

W is a siphon-pipe which conducts petroleum or other suitable fluid hydrocarbon from the reservoir P to the outer retort. This pipe divides into several branches, as shown at *w'*, and pass through the cover, so as to allow the fluid hydrocarbon to drop upon the red-hot coke or charcoal in the outer retort in several places.

X is a pipe which conducts the purified gas from the washer to the gasometer.

Operation: The reservoir P is filled with petroleum or other fluid hydrocarbon, as herein described, which is allowed to flow through the siphon-pipe W and *w'* and fall onto pieces of red-hot coke, charcoal, or fire-brick contained in the outer retort, D, and at the same time water from the condenser or other suitable source flows through the siphon-pipe O', through the flange or cover K', and falls upon

the smooth sloping red-hot piece of fire-brick *i* at the bottom of the pipe \mathcal{Z}^2 . The upper chamber, *f*, of the inner retort is filled with coke or charcoal, as shown at *f*. The outer annular chamber, *h*, is also filled with coke or charcoal, as shown at *h*. After a fire has been lighted in the furnace and the retorts have become red hot, the petroleum or other fluid hydrocarbon falling upon the red-hot coke or charcoal, will be converted partly into permanent gases and partly into volatile hydrocarbons. These, having no other outlet, will pass through the openings or channels *J* into the lower chamber, *g*, and there meet with globules of water in its spheroidal state, thrown off from the sloping red-hot smooth surface of the fire-brick *i*. From the known properties of water when thrown into its spheroidal state at a very elevated temperature in an atmosphere of hydrocarbons, the hydrocarbon vapors are converted into permanent gases by the influence of presence or catalysis, thereby preventing any subsequent condensation, and, with the permanent gases previously formed and the vapor of water, pass up through the grating *e* and through the red-hot coke into the upper chamber, *f*, of the inner retort. Any vapor of water which is not decomposed by the hydro-

carbon vapors or gases is converted into gases—carbonic acid, carbonic oxide, and hydrogen—by passing over the surface of red-hot coke, which, mingling with the permanent gases from the petroleum, pass on with them to the education-pipe *M*, and thence to the condenser *N*. If any part of the hydrocarbon vapors have escaped conversion into permanent gases when coming in contact with water in its spheroidal state at a very high temperature, which it is one material object of this apparatus to effect, they will be here condensed, and the resulting fluid pass through the pipe *Q* back to the petroleum-reservoir, thus preventing any loss. The permanent gases will pass on to the washer through the pipe *S*, and in the usual way through the exit-pipe *X* to the gasometer.

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

A compound retort, *D D'*, containing three chambers, *f g h*, constructed, arranged, and used (either vertically or horizontally) for the purposes and substantially as herein set forth.

JAS. E. THOMSON.

Witnesses:

E. B. FORBUSH,
W. H. FORBUSH.