

(64&66.)

H. S. MAXIM.

Improvement in Gas Apparatus.

No. 122,625.

Patented Jan. 9, 1872.

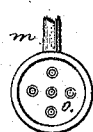
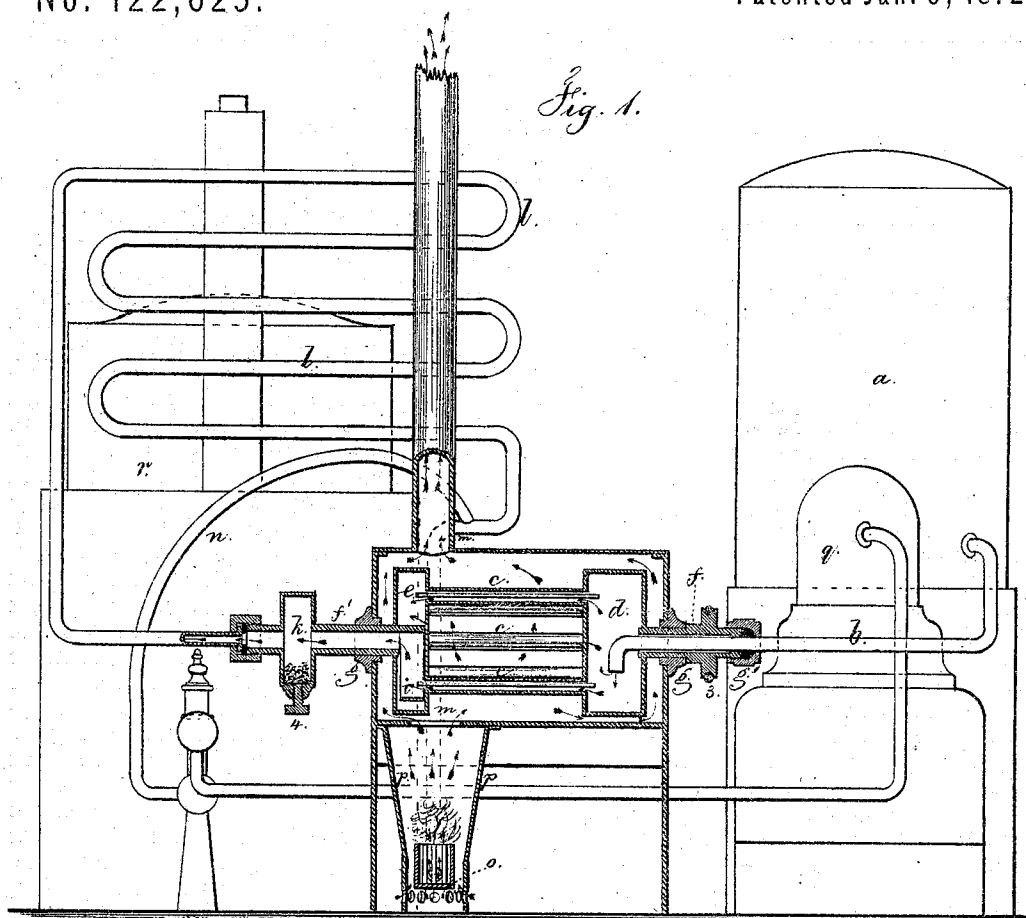


Fig. 4.

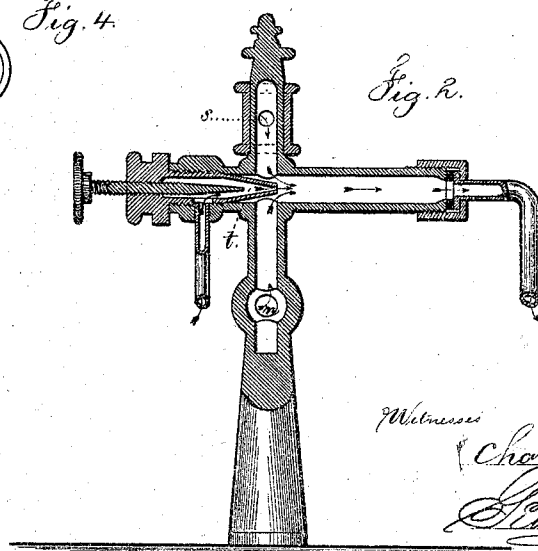


Fig. 2.

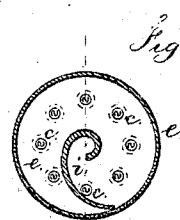


Fig. 3.

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Witnesses
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UNITED STATES PATENT OFFICE.

HIRAM S. MAXIM, OF BROOKLYN, NEW YORK, ASSIGNOR TO MYRON H. STRONG, OF SAME PLACE.

IMPROVEMENT IN GAS APPARATUS.

Specification forming part of Letters Patent No. 122,625, dated January 9, 1872.

To all whom it may concern:

Be it known that I, HIRAM S. MAXIM, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Gas-Making Apparatus; and the following is declared to be a correct description of the same.

My apparatus is for vaporizing and decomposing liquid hydrocarbon for the production of illuminating gas, and I employ a portion of the liquid for this object and the remainder is consumed in heating the retort or generator. The apparatus is automatic, and when the generator is of a high temperature most of the liquid will be decomposed, and there will be less liquid condensing and passing to the heating flame, and when the generator cools down there will be a greater portion of the liquid hydrocarbon passing through in the form of vapor instead of being decomposed into a gas; hence this, when it condenses, will increase the supply to the fire and intensify the heat of the fire applied thereto. I also make use of a jet of steam to force the gaseous hydrocarbon and an admixture of air into the gas-holder, said steam forming a purifier, and removing the dust and impurities from the gas by causing the same to fall with the condensed watery vapors.

In the drawing, Figure 1 is a vertical section of the gas-generator or retort, with the other parts of the apparatus in elevation. Fig. 2 is a section of the injecting and mixing nozzles. Fig. 3 is a section of the drum at the delivery end of the generator or retort; and Fig. 4 is a plan in larger size of the heating-burner or pan.

The vessel *a* is to contain gasoline, naphtha, or other liquid hydrocarbons, and the pipe *b* conveys the same to the gas-generating mechanism. The supply is regulated by a cock or otherwise. The generating-retort is composed of a series of tubes, *c c*, between the hollow drums *d* and *e*, and these are mounted upon hollow axles *f f'*, that revolve in suitable bearings *g*, and a pulley, 3, and belt or chain are employed to connect the retort with any suitable motor, such as an engine, so that the retort will be revolved at the required speed to present the different parts to the action of the heating-flame. The pipe *b* passes in through the hollow journal *f*, and there is a packing at *g'* to keep the parts tight. Within the tubes

c there are strips of sheet metal or similar material lying loosely. I prefer and use strips corrugated in the direction of their length, so that they will act as scrapers to keep the interior surface free from a deposit of carbonaceous matter, the same working out at the end into the drum *e*, and being lifted up by the inclined shoe *i* as the retort is revolved, and delivered through the hollow journal *f'* into a hollow drum, *k*, from which it may be withdrawn periodically by removing a stopper or plug, 4. The vapors generated in the revolving retort will be partially a permanent illuminating gas and partially a vapor, that will condense into a heavy oil or tarry substance. In order to separate these the vapors and gas pass up into the coil or condenser *l*, and the liquid that condenses runs, by the pipe *m*, to the heating device of the retort, while the permanent gas passes, by the pipe *n*, to a gas-holder. In order to heat the retort from the combustion of the liquid condensed in *l* I make use of a burner that will not become clogged by the tar or residuum. This burner is constructed as a pan, *o*, with air-tubes running up from the bottom, and the liquid runs into the pan around these tubes and is set on fire, and will burn, the air passing into the flame through the said tubes, and in this manner the combustible portions will be consumed, and the accumulation of earthy matter at the bottom can be removed from time to time or else other burner-pans be introduced. The flame passes up within the case *p* surrounding the revolving retort, and it will heat the drum *e* to the highest temperature thereby. The destructive distillation of the liquid hydrocarbon and the production of a permanent gas will be gradual from the cooler to the hottest end, and there will consequently be but little residuum, and the retort will not require to be as hot as usual, because the heavy oils are not all made into permanent gas, but only vaporized, and subsequently condensed and burned to heat the retort. As aforesaid, this apparatus is automatic, and when the retort becomes too cool the supply of combustible liquid is increased, and when the heat therefrom is too great the liquid supplied will be lessened.

In order to relieve the generator or retort from pressure I make use of a jet of steam sup-

plied from any suitable boiler, *g*, and issuing adjacent to the termination of the pipe *n*, so as to produce a vacuum or suction action, and at the same time the jet of steam forces the gas forward into the gas-holder *r*. The jet *t* and pipes are shown in section in Fig. 2, and when desired to mix atmospheric air with the permanent gas the same is effected by admitting a regulated quantity at *s*, a small turning cylinder or register serving to determine the amount. The steam, issuing from the jet *t* and coming intimately into contact with the gaseous hydrocarbon, serves to purify the same by moistening the fine particles of dust and foreign matter, so that the same will fall and be removed with the water of condensation.

I claim as my invention—

1. A revolving retort made of hollow drums, connecting-tubes, and loose scraping strips to prevent the tubes becoming obstructed, substantially as set forth.

2. The inclined shoe and chamber *e*, combined with the revolving retort, for removing foreign substances, as set forth.

3. The automatic heating of the retort or generator by the liquid that is condensed from the liquid hydrocarbon that is vaporized, substantially as set forth.

4. A jet of steam applied between the retort and the gas-holder to draw the gas from the retort and force it into the holder, in combination with a variable air-inlet for atmosphere that is mixed with such gas by the jet of steam, as set forth.

Signed by me this 24th day of November, A. D. 1871.

HIRAM S. MAXIM.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.

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