A. C. LIPPITT.

APPARATUS FOR THE MANUFACTURE OF GAS.

No. 188.473. Patented March 20, 1877.

Fig. 1.

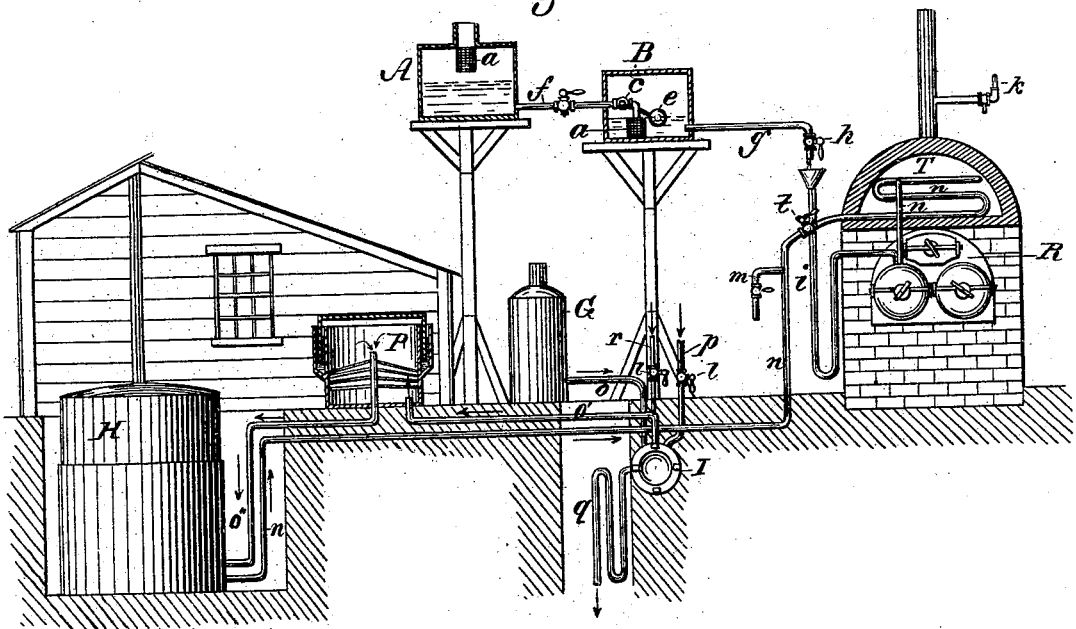
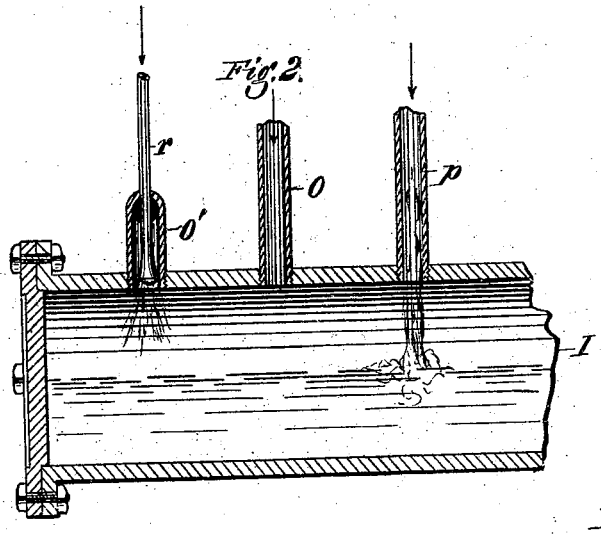



Fig. 2.

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## IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF GAS.

Specification forming part of Letters Patent No. **188,473**, dated March 20, 1877; application filed March 22, 1876.

*To all whom it may concern:*

Be it known that I, ANDREW C. LIPPITT, of New London, in the county of New London and State of Connecticut, have invented certain Improvements in Apparatus for the Manufacture of Gas, of which the following is a specification:

My invention consists in so combining and arranging the several parts of the apparatus that the supply of the water-gas and of the petroleum to the retort can be adjusted or regulated, and made to act with uniformity, whereby the quality of the gas produced will be rendered more uniform, as hereinafter more fully described.

In the drawing, Figure 1 represents a front elevation, partly in section, illustrating an apparatus and method of applying my invention in connection with the Harkness process; and Fig. 2 is a longitudinal section of a portion, shown more in detail.

In the manufacture of gas by the Harkness and similar methods, the steam is passed through the hot coal in the generator, and from thence flows directly to the retort, the result of which is that the supply to the retort is irregular, and can only be continued until the supply from the generator is exhausted.

In like manner the oil or petroleum is taken direct from a tank to the retort, whereby the supply of it is also rendered irregular and varying, and it follows from these two causes that the proportions of the water-gas and of the petroleum cannot be regulated and controlled with that certainty and uniformity that is necessary in order to produce an illuminating-gas of proper quality. If there be too much of the petroleum the gas will smoke when burned; and if too little, then the gas will be lacking in illuminating power.

The object of my invention or improvements is to overcome these difficulties, which I do in the following manner:

Referring to the accompanying drawing, G represents the generator and R the retort, which may be of the style described in said Harkness patent, or of any other suitable style. Instead of taking the water-gas from the generator direct to the retort I convey it by a pipe, *o*, to a hydraulic main, I. Into this main, as shown in Fig. 2, I tap two pipes, *r* and *p*, through the latter of which a stream of cold water is allowed to flow, to keep the water in the main cool, while in the pipe *r* I arrange a sprinkler, through which a spray of cold water enters the main to wash and purify the water-gas as it enters from the generator, the surplus water flowing from the main I through the bent pipe *q*, (shown in Fig. 1.) One result of this is that, if by forcing the steam through the generator, any portion of it passes through in the form of steam without being decomposed, it is condensed in the main I, and is thus arrested and prevented from entering the purifier or holder beyond.

From the main I the water-gas is then conducted by a pipe, *o'*, into a lime purifier, P, which may be either wet or dry, as preferred, where it is purified in the usual manner by taking therefrom the sulphur, carbonic acid, &c. From the purifier P the gas is conducted by a pipe, *o''*, into a gasometer or holder, H, from whence it is conducted by a pipe, *n*, to the retort R, the pipe *n*, before entering the retort, being coiled or carried back and forth in a heating-chamber, T, located above, or at any suitable point near the retort, where it may be heated by the escaping gases from the furnace of the retort. By this arrangement the water-gas is heated before it enters the retort.

It will be seen that by this arrangement I not only wash or cool the water-gas as it comes from the generator, thereby separating therefrom any steam which may have accidentally passed the generator, but also purify it by passing it through a lime purifier, thus removing all impurities before it enters the retort. In addition to this, by conducting it into the holder H I am enabled to feed it therefrom into the retort under a regular and uniform pressure, whereby I can control the supply to the retort perfectly, it, of course, being understood that the supply-pipe *n* will also be provided with suitable valves or cocks, as shown at *t*, Fig. 1, to be located at any convenient point.

In order to regulate with equal certainty the supply of petroleum I arrange two tanks, A and B, as represented in Fig. 1. The tank A is intended as the main supply-tank, while the tank B, which is connected thereto by a

pipe, *f*, provided with a stop-cock, is designed as a regulating tank or device. In this tank B is located a float, *e*, connected by a lever to a cock, *c*, in the pipe *f*, by which the height of the oil in tank B is automatically regulated—any of the well-known styles of automatic or float valves being used for this purpose, as may be preferred. By this means the oil flows from the tank B, under a uniform pressure, thus insuring a regular and even supply to the retort, which is a matter of great importance. From the tank B a pipe, *g*, provided with a stop-cock, *h*, conducts the petroleum or oil into a funnel-mouthed tube, *i*, which carries it into the retort, as shown in Fig. 1. If desired, a strainer, *a*, may be arranged in either or both of the tanks A and B. I also propose to carry the oil-pipe into and through the heating-chamber T, so as to heat the oil before it enters the retort, thus bringing the oil and the water-gas both in a heated condition into the retort, whereby a more ready union of the two is effected.

For the purpose of testing the gas before it enters the retort I attach an outlet-pipe, *m*, with a stop-cock, to the supply-pipe *n* at any suitable point between the holder and the retort, it being represented in Fig. 1 as being by the side of the retort for convenience. In like manner I provide a burner, *k*, connected to a pipe leading from the retort, by which the gas, after being formed in the retort, may also be tested by the application of a photometer, or other suitable means, so that its illuminating-power can at any time be determined or ascertained.

By these means it will be seen that I can regulate with certainty the supply of both the water-gas and the oil to the retort; and that, when these are once adjusted so as to furnish the proper proportion of each, the formation of the completed gas is rendered continuous and uniform so long as the supply is kept up, thereby effectually overcoming the difficulties hereinbefore mentioned; and, further, that the gas thus produced is not only freed from impurities, but is also rendered uniform in its quality—a result which has hitherto been unattainable.

By disconnecting the generators from the retort and passing the water-gas into a holder for future use, I am able to run the generators when the retort is not in use, and also to run the retort when the generators are not in use.

By this means I am also able to test water-gas before it enters the retort, and, if found impure, to reject it or pass it again through the purifiers, the pipes, of course, being suitably arranged for that purpose.

By separating the generator from the retort, and conducting the water-gas into a holder, I am also enabled to supply heating-gas direct from the holder for heating purposes—this water-gas burning without the addition of oil, this latter being required only when the gas is to be used for illuminating purposes.

It is obvious that either the hydraulic main, the lime purifier, or the holder may be used separately with the generator; but I prefer to use them all together, as giving the best and most perfect results.

It is also obvious that the various devices may be arranged differently and modified in construction without departing from the principle of my invention, the plan shown and described sufficiently illustrating my invention to enable any one skilled in the art to understand and apply the same.

By actual experiment I have found these improvements to be of great value, as by their use, in connection with the Harkness process, I am able to produce a very superior quality of gas, and also to run the works with regularity and certainty, insuring the production of the gas of uniform quality and with much less attention.

Having thus described my invention, what I claim is—

1. In combination with the retort R, the automatic or self-regulating cock *c*, for controlling the flow of the oil, and the gas-holder H, for supplying the water-gas to the retort, whereby the relative quantities of the oil and water-gas are rendered constant, so as to produce an illuminating-gas of uniform quality, as set forth.

2. In combination with the self-regulating oil-supplying device and the gas-holder, the cocks *h* and *t* in the pipes connecting the oil-tank and the gas-holder with the retort, for the purpose of adjusting and controlling the relative quantities of the oil and gas fed into the retort, as set forth.

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Witnesses:

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