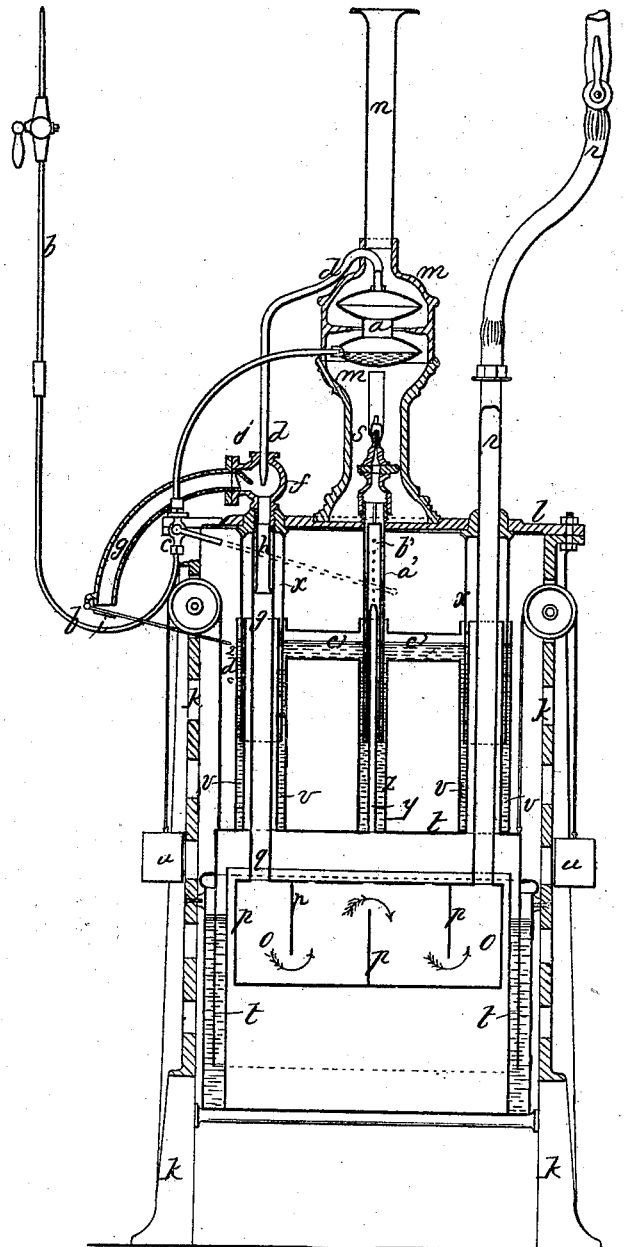


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*Gas Appr.*

*N<sup>o</sup> 113,192.*

*Patented Mar. 28, 1871.*



*Witnesses;*

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# UNITED STATES PATENT OFFICE.

XAVIER MOUSSARD, OF PARIS, FRANCE.

## IMPROVEMENT IN PRODUCING GASES FROM HYDROCARBONS.

Specification forming part of Letters Patent No. **113,192**, dated March 28, 1871.

*To all whom it may concern:*

Be it known that I, XAVIER MOUSSARD, of Paris, in the French Empire, have invented Improvements in Apparatus for the Production of Gases for Lighting and Heating Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making a part of the same.

This invention consists of an improved self-acting apparatus for carbureting atmospheric air for the production of gases for lighting and heating purposes.

In order that the invention may be more fully understood, I will proceed to describe the same with reference to the accompanying drawing, which shows a central vertical section of my said apparatus.

My invention relates to an improved mechanism for automatically regulating the amount of gas produced in vaporizing schist, petroleum, &c., so that it may be more or less rapid, according to the amount drawn off from the reservoir or gasometer; and the invention consists in so arranging a perforated discharge-tube in connection with a bell suspended by weights, and with the burner beneath the reservoir containing the schist, petroleum, or other matter to be vaporized, that when a bell is lowered by escape of gas, a larger number of apertures shall be uncovered to increase the volume of gas conducted to the burner, and when the bell is raised by an accumulation of gas in the reservoir, a smaller number of apertures shall be exposed, so as to diminish the discharge of gas to the burner, all as hereinafter explained.

The reservoir of material or liquid for feeding the boiler *a*, which produces the jet of vapor, is connected to the said boiler by a pipe, *b*, provided with a regulating-cock, *c*. This reservoir is placed at a greater height than is necessary, to counterbalance the pressure of vapor which forms the jet; or said reservoir may only be partially filled with liquid, so as to leave a film of air at its upper part, which may be compressed to any number of atmospheres.

The vapor generated from petroleum, schist, or other liquid or substance employed escapes from the boiler *a*, under pressure, through a pipe, *d*, terminating in a nozzle within a small

chamber, *f*. This chamber *f* is in communication with a tube, *g*, open to the atmosphere, and with a second tube, *h*, of rather larger diameter than tube *d*, with which it coincides in direction. The tube *g* is furnished with two valves—the one *i* operated by a lever to close it to the atmosphere, as hereinafter explained, and the other, *j*, placed within the chamber *f*.

The frame of the apparatus is composed of two vertical standards, *k*, connected at their upper ends by a cross-piece, *l*.

*m* is a casing, which serves as a support for the boiler *a*, and confines the heat from the burner to the side of the boiler, to every part of which it has free access. *n* is the chimney. *o* is a chamber filled with pumice-stone, coke, cotton-waste, felt, or other absorbent. This chamber is provided with diaphragms or curtains *p*, which detain the gas and prolong its circulation.

*q* *r* are pipes in communication with chamber *o*. The pipe *q* is connected to the cross-piece through which pipe *r* passes, and forms an escape or eduction pipe for the gas generated.

*s* is a burner for heating the boiler *a*.

*t* is a bell-chamber, sustained, in addition to the pressure of the gas, by counter-weights *u*. On this chamber *t* are mounted pipes *v*, sliding telescopically within other pipes, *x*, that are firmly secured to the cross-piece *l*, the space between being filled with water to prevent the escape of gas.

*y* is a tube, connected to chamber *t*, for conducting the gas to the burner. This tube *y* slides telescopically within tube *a'* of the burner, both being inclosed by an outer tube, *z*. Tube *a'* is carried by the cross-piece *l*, and contains another tube, *b'*, perforated throughout its length.

*c'* is a horizontal pipe connecting the pipes *v* *z* *v*, to maintain the same level of water within each.

The whole being arranged as described, the action of the apparatus is as follows: The petroleum, schist, or other matters employed is vaporized in boiler *a*, whence the vapor escapes by the tube *d*, through the nozzle of which it is injected into chamber *f*. The jet of vapor passing into tube *h* induces a current of atmospheric air within tube *g*, the air and

vapor passing together through pipe *q* into chamber *o*, filled with absorbent material, whence the mixture of air and vapor escapes through the outlet-pipe *r*.

The chamber *o* is provided with perforations, through which the gas enters the bell-chamber *t*, which rises in proportion as the gas is produced or generated. This bell *t* has also a water-joint, to prevent leakage and wear.

A small quantity of gas escapes from the bell *t* through pipe *y*, to supply the burner *s*, passing out through the perforations in pipe *b'*, which are above the level of the water, and thence into the annular space between this tube *b'* and the outer one, *a'*, until it finally reaches burner *s*.

From the foregoing arrangement it will be seen that if the bell has sufficient gas stored within it to serve for the supply, it remains stationary; and if the supply of gas contained diminishes, it falls, thereby uncovering a greater number of apertures in tube *b'*, and allowing a greater quantity of gas to be supplied to the burner, the vaporization and consequent formation of gas being thereby accelerated. The bell rises as the gas is generated, the water closing the holes or apertures in the same proportion, whereby less gas will be supplied to the burner, so as to gradually lessen the production or generation of gas in the apparatus.

Finally, when the bell is entirely filled, the holes or apertures provided in tube *b'* will all be immersed, and no more gas will be supplied to the burner. For greater security or safety I dispose upon one of the pipes *v*, conjointly with the bell, a small tappet, *d'*, which, when the latter rises to the full extent, acts on the lever of valve *i*, and closes the latter to prevent the introduction of air through pipe *g*.

From the foregoing description it will be readily seen that the apparatus has an automatic action. Instead of making perforations in tube *b'*, I may make a slot throughout its length, the action being the same as before, said slot being covered more or less by the water, to allow of the admission of a larger or

smaller quantity of gas in a given length of time.

If desired, the tube *b'* may be dispensed with, and a cock or valve substituted, to be actuated by the motion of the bell; or the latter may act on a flexible pipe for regulating the supply; or the tube *b'* may be further arranged with a conical end fitting in a socket, for regulating the gas-supply.

Instead of water, other liquids or fluids not liable to freeze—such as wine, alcohol, quicksilver, or glycerine—may be employed for preventing the escape of gas.

By means of this improved apparatus the whole of the utilizable properties may be extracted from the light or volatile liquids by distillation, and I thus avoid the intermittent action to which other apparatus are liable when operating in a cold state, as in these cases there always remains a sediment containing matters which are utilizable by distillation.

The gas produced in the above manner may be employed for illuminating light-houses, beacons, railway-carriages, and otherwise, and for heating steam-boilers, cooking, and other heating purposes, by means of jets of vapors of petroleum, schist, or other matters, which, on being projected into a larger tube, induce a current of air for carbureting the latter, in the manner hereinbefore described.

The quantity of air admitted and to be mixed with a given quantity of vapor is regulated by varying the position of the nozzle of injector *d* with regard to the larger air-tube *h*, leading to the bell.

#### *Claim.*

The combination of the tube *b'*, provided with apertures, with pipe *y*, bell *t*, perforated chamber *o*, the burner *s*, and casing *m*, arranged substantially as and for the purpose specified.

XR. MOUSSARD. [L. S.]

Witnesses:

C. ANOT,

A. GUION, Jr.