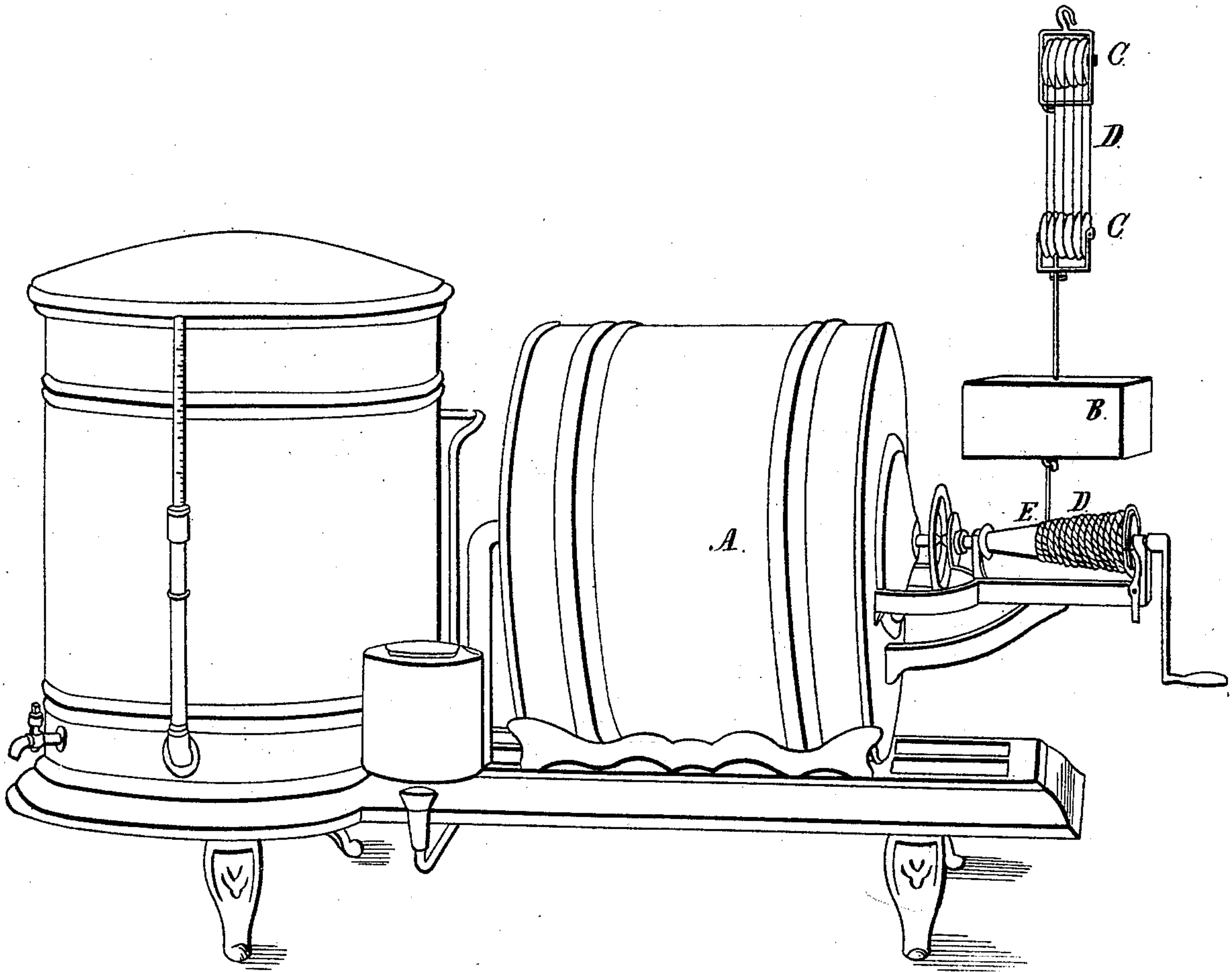


*O. Tirrill.*

*Carburetor.*

*N<sup>o</sup> 94,360.*

*Patented Aug. 31, 1869.*



*Witnesses:*

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# United States Patent Office.

OAKES TIRRILL, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 94,360, dated August 31, 1869.

## IMPROVED APPARATUS FOR CARBURETTING AIR AND GAS.

### *To whom it may concern:*

Be it known that I, OAKES TIRRILL, of Boston, county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Carburetting Air and Coal or other Gases; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

The nature, operation, and use of my invention may be better understood by the following facts and explanations.

Naphtha-gas is a simple mixture of air and the vapor of naphtha, and is generated by passing the air over or through the naphtha.

The illuminating-power of this gas or mixture depends on the proportion which the naphtha-vapor bears to the whole volume of the mixture.

The amount of naphtha-vapor which air will evaporate or absorb, depends on the quality or grade of the naphtha employed, and on its temperature.

Gas-machines only act while gas is being used, at all other times being entirely inert.

When gas-machines are from time to time started, the gas first generated on each of these occasions is of a certain quality or illuminating-power, depending, as before stated, on the grade and temperature of the naphtha, and if these conditions of the fluid were fixed and invariable, the lights would also be unchanged in volume and quality.

Under the natural operation of a gas-machine while generating gas, the conditions of the fluid are constantly changing, and the lights produced change in the same degree.

These changes are—

First, the air takes up the lighter particles of naphtha first, and the remainder being constantly heavier, is evaporated more slowly, and the air being less impregnated, the gas or mixture is poorer in vapor, and the lights tend to diminish in volume and quality.

Second, the evaporation of the naphtha abstracts its caloric or residing heat, and in proportion as this heat is withdrawn, the naphtha loses power to evaporate as at the beginning, the mixture or gas becomes gradually poorer, and the lights correspondingly diminish in volume and quality.

The gas made from naphtha by gas-machines does alter and become gradually impoverished from the moment the process begins, and this has been the great objection to their use.

While the above remarks apply especially to the mode of carburetting air, or charging it with naphtha, it is apparent that the same are equally applicable in the case of carburetting coal or other gases instead of air. In charging coal-gas or other gas with the vapor of hydrocarbons, the same difficulty as that above noted is met with.

The object and effect of my invention are to obviate this difficulty, and remedy this defect of a continual falling off or wasting of the lights for the reasons previously assigned, and to maintain an equal, full, and sufficient light continuously from the beginning to the end of any one period of using the machine.

It is evident that if an equal amount or volume of vapor (which is the only source of light in the naphtha-gas, and is the source of the increase of light in the coal or other gas charged with it,) could be made continuously to pass through each burner in an equal time, the lights would remain undiminished. This is the object of my invention, that is, to deliver through the burners an equal and sufficient amount of naphtha-vapor, from the beginning to the end of one operation or performance of the machine, notwithstanding its varying proportion in the mixture of air and vapor combined, and in spite of the constantly-diminishing ratio of the vapor to the air.

The invention by which this is accomplished may be understood by reference to the annexed drawings, which represent an entire gas-machine.

This machine consists of a generator, pump, and other parts, which, as they are well known and understood by those skilled in the art to which this invention pertains, need not be described.

The pump A, to which the weight is attached, is used to force air into the generator.

This pump is made to revolve by means of the weight B, the pulleys C C, the cord D, and the drum or spool E, connected with the pump, on which the cord is wound when the machine is in operation.

A given weight, and a given diameter of spool, will always give uniform pressure in the generator, and deliver through the burners an equal amount of gas in an equal time.

Now, as the gas is constantly decreasing in richness, in order to maintain the lights uniformly, and without diminishing in volume, the pressure ought to regularly increase, so as to deliver more and more gas through the burners in proportion as it grows poorer in quality. This is effected by employing a tapering drum or spool, as shown in the drawing, instead of the usual cylindrical form.

The operation is thus:

The cord is wound upon the drum E from the larger end toward the smaller end.

The weight is made sufficient to give the required pressure when the machine begins to operate from the smaller end.

The machine being started, the pump revolves, forces air into the generator, and the gas is made.

For the reasons previously given, the gas is constantly deteriorating in quality, and the lights soon gradually diminish, were it not that as the machine goes on operating, the cord progresses upward on the



spool E, giving to the weight more and more power, thus increasing the pressure, and delivering through the burners a constantly-increasing volume of gas.

The lights are thus maintained at a regular uniform height, and the former great objection to automatic gas-machines is removed.

It is obvious that my invention is equally applicable to the carburetting of coal and other gases, as to the manufacture of naphtha-gas, and that the flow of gas through the chamber in which it is to be carburetted, by means of the tapering spool, can be increased in proportion as the carburetting-fluid becomes poorer in quality.

I prefer the use of the tapering spool, made substantially as shown, but it is manifest that various devices may be employed to effect a like result, viz, the increase in the pressure of the gas in proportion as it grows poorer in quality.

What I claim, therefore, and desire to secure by Letters Patent, is—

1. The method of increasing the pressure of the

gas, or the quantity of such gas supplied to the burner, in proportion to the decrease in the volume of the hydrocarbon-vapor with respect to that of the air or coal or other gas with which it is mingled, substantially as and for the purposes set forth.

2. The employment of a tapering spool or its equivalent, connected with the air or gas-pumping devices, substantially as described, so as to steadily increase the pressure of gas in the machine while the same is in operation, for the purpose specified.

3. The use of the tapering spool, hereinbefore described, with machines for carburetting coal and other gases, substantially in the manner and for the purposes described.

In testimony whereof, I have signed my name to this specification, before two subscribing witnesses.

OAKES TIRRILL.

Witnesses:

NATHANIEL GILL,  
WM. H. CLARKSON.