(No Model.)

# N. A. RANSOM.

## APPARATUS FOR CARBURETING GAS.

No. 275,268. Patented Apr. 3, 1883.

Fig. 1.

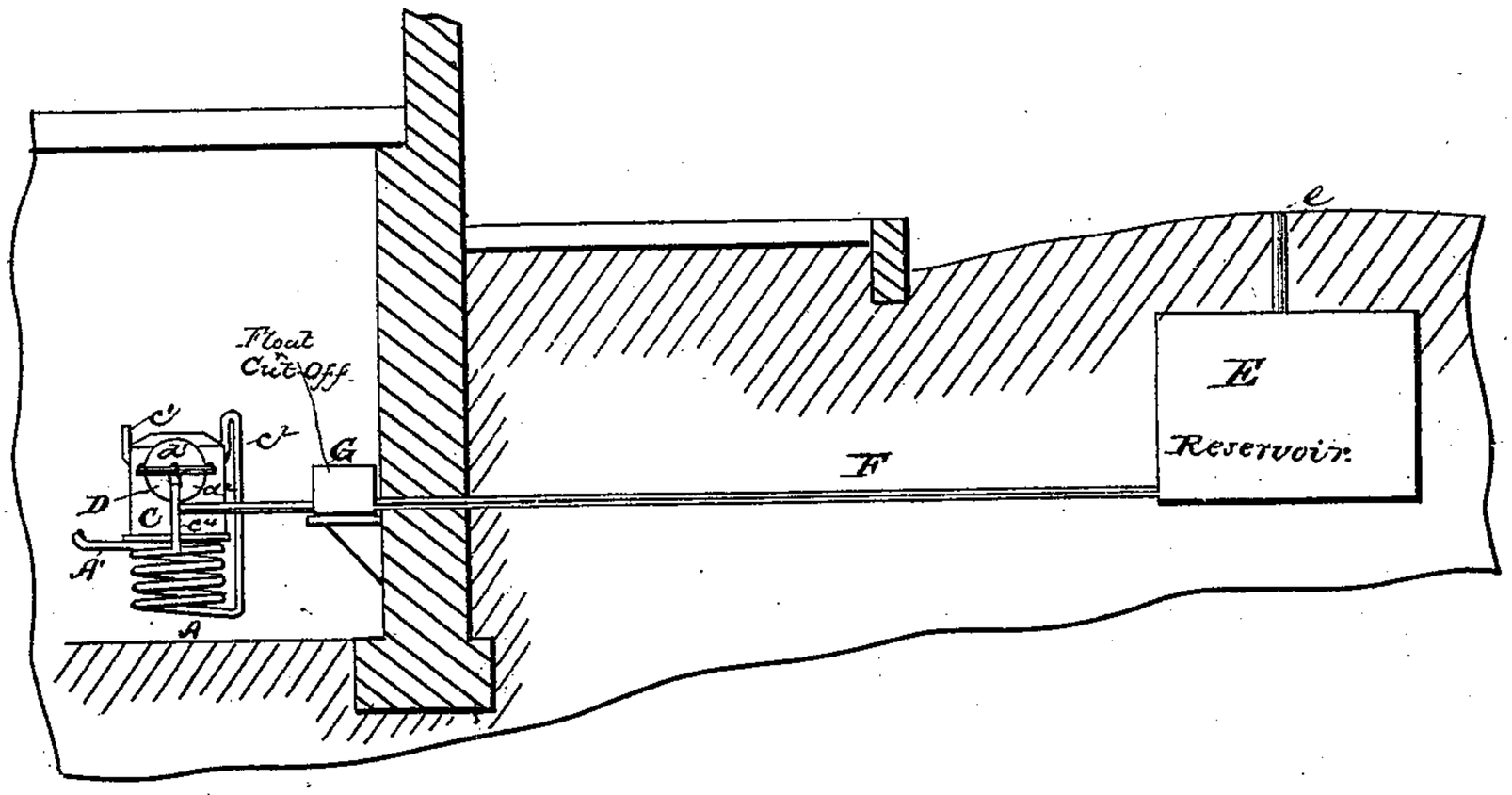



Fig. 2.

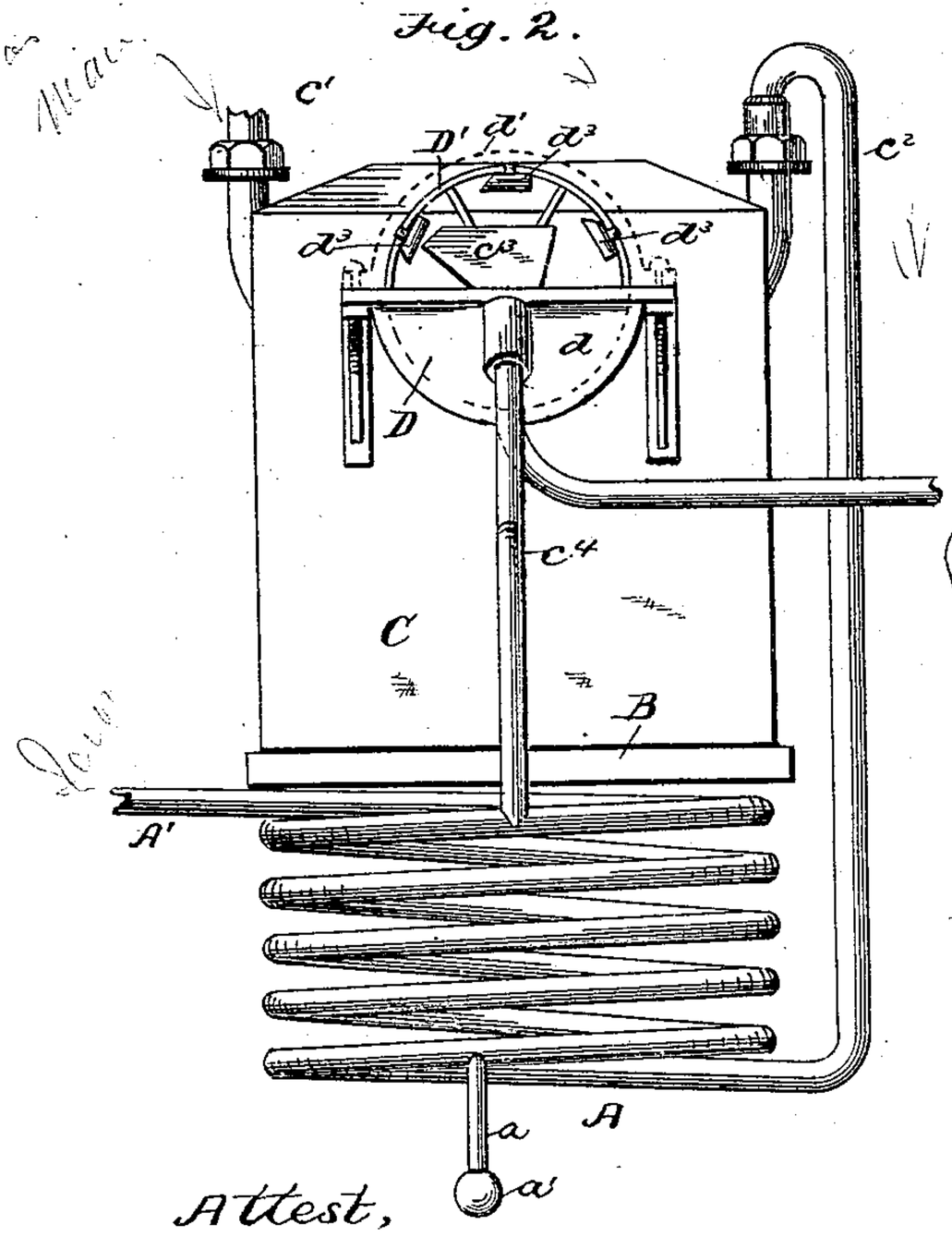
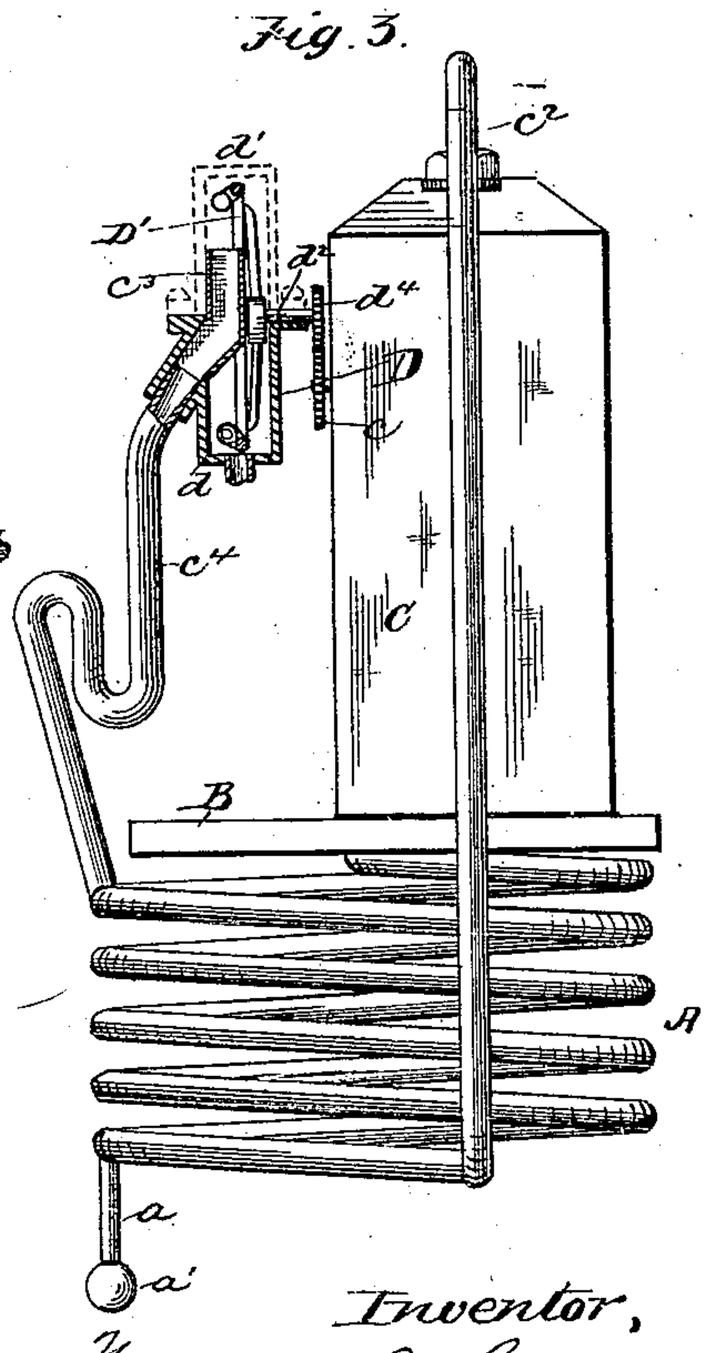



Fig. 3.

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## APPARATUS FOR CARBURETING GAS.

SPECIFICATION forming part of Letters Patent No. 275,268, dated April 3, 1883.

Application filed January 22, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, NEWMAN A. RANSOM, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Carbureting Gas; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view showing the invention arranged for operation; Fig. 2, a front view of the meter, carbureting-coil, and feeding devices; and Fig. 3, an end view of the same.

Similar letters of reference in the several figures denote the same parts.

My invention relates to that class of apparatus which are designed to supply hydrocarbon to ordinary illuminating-gas for the purpose of enriching the quality and increasing the illuminating-power of the latter; and it has for its object to so improve such apparatus as to enable them to supply to the gas under all circumstances a uniform quantity of hydrocarbon, thereby insuring a light of given quality, whether one or any larger number of burners are used at the same time in a building provided with the apparatus.

Heretofore various attempts have been made to accomplish the object aimed at by me, but all have proved abortive and ineffectual. Where a given number of burners were to be used at once not much difficulty was experienced in securing a supply of carbureting-fluid just sufficient to produce the desired quality of light; but when such given number of burners was increased or diminished the proper relative quantity of the fluid was not supplied to the varying flow of gas—that is to say, when less than the given number of burners was employed, too much of the fluid was supplied, and when a greater number, less than the requisite quantity, resulting in the first case in a smoking light, and in the second case in the failure to realize the expected saving. In perhaps the most prominent of the pre-existing kinds of apparatus the valve or float of a gas regulator or governor is connected to a valve or cock in a pipe through which the hydrocarbon liquid is supplied, and the outlet of the governor leads to the lower end of a carbureting-coil, while the hydrocarbon-pipe leads to the upper end of said coil. With such an apparatus it is claimed that the supply of hydrocarbon can be automatically controlled by the flow of gas, so that the hydrocarbon shall at all times be supplied in a quantity sufficient for the volume of gas; but by careful investigation I have found that such claim is without foundation, for by reason of there being a direct flow of hydrocarbon from the hydrocarbon-reservoir to the carburetor through the supply-pipe the pressure on the hydrocarbon varies as the amount of fluid contained in the reservoir is increased or diminished, and consequently while the flow of gas may open the valve of the governor more or less, and thus open more or less the cock in the hydrocarbon-pipe, yet the quantity of hydrocarbon allowed to pass through the aperture of the cock will not be uniform under all circumstances, but will vary as the pressure varies. Moreover, the cock in the hydrocarbon-pipe, in order to be worked by the governor-valve, has to be so loose as to leak and pass the fluid into the carburetor when no gas at all is being consumed.

In another form of apparatus existing prior to my invention a meter has been interposed in the gas-supply pipe, and hydrocarbon has been supplied to a carburetor interposed in the said pipe between the meter and the burners by means of a cut-off mechanism operated by the meter and located at the bottom of a hydrocarbon-receptacle arranged above the carburetor. In this apparatus, however, the hydrocarbon-receptacle being above the carburetor, and owing to the necessary looseness of the joints of the cut-off, due to the employment of so feeble a motor as a meter, more or less of the hydrocarbon gravitates and works its way into the carburetor, even when the cut-off is closed, thus at times unduly enriching the gas. The same or equally objectionable features are to be found in other old kinds of apparatus.

With full knowledge of these prior inventions and of their failure to do the work intended to be done by them, I have made my present invention, and by practical test I have found it to answer all the requirements. My

invention operates on an entirely new and different principle; and it consists primarily in the combination of a gas-supply pipe, a meter or other mechanism arranged in said pipe and given a certain amount of movement by each foot or other quantity of gas passing through said pipe, a carburetor into which the gas discharges after passing the meter, a feed-receptacle containing the carbureting-fluid, and devices receiving motion directly from the meter, and operating to positively lift the carbureting-fluid and discharge it into a pipe leading to the carburetor; secondly, in the combination of a gas-supply pipe, a meter or other mechanism arranged in said pipe and given a certain amount of movement by each foot or other quantity of gas passing through said pipe, a carburetor into which the gas discharges after passing the meter, a feed-receptacle containing the carbureting-fluid, and a feeding-wheel operated directly from the meter, and having buckets which, as the wheel revolves, dip into the carbureting-fluid, and, rising, discharge their contents into a pipe leading to the carburetor.

In the accompanying drawings, which represent one embodiment of my invention, A is an ordinary carburetor consisting of a coiled iron pipe adapted to be located in the basement of the building to be lighted, and of a capacity sufficient for the amount of gas likely to be used in said building. On the top of this carbureting-coil is placed a bed or platform, B, upon which is mounted a gas-meter, C, and a feed-box, D. The meter does not differ from those in common use, except that the shaft which carries its registering-train is extended out through the casing toward the feed-box, and carries a gear, *c*, at or near its end. The gas is conducted to the meter from the street-main through a service-pipe, *c'*, and after passing through the meter passes down a pipe, $c^2$, into the lower end of the carburetor, as shown.

The feed-box D is preferably made of metal and in two sections, *d d'*, secured together by screws or other means, with a suitable packing interposed between them to form a tight joint. Mounted within this feed-box, upon one end of a shaft, $d^2$, which has its bearings in one side of the lower section, is a feed-wheel, D', preferably of dish-shaped form, and having attached to its concave side, near its periphery, a series of small buckets, $d^3$. The outer end of the feed-wheel shaft is provided with a gear, $d^4$, which is adapted to engage with and derives motion from the gear *c* on the extended meter-shaft. Stuffing-boxes are provided in both meter-case and feed-box where the respective shafts pass through. Attached to the lower section of the feed-box, opposite the concave side of the feed-wheel and within the periphery of the latter, is a chute or hopper, $c^3$, to the smaller end of which is connected a pipe, $c^4$, leading to the upper portion of the carburetor. This pipe $c^4$ is bent into curved form, as shown, so as to form a trap. A pipe, A', leads from the upper end of the carburetor to the burners in the building.

E is a tank or reservoir for containing the carbureting-fluid, located at any safe distance from the building, but preferably, if in a city, in the ground under the street. A small pipe, *e*, extends up to or above the surface of the street for the purpose of enabling the tank to be filled when necessary. An influx-pipe, F, leads from the tank or reservoir E to the feed-box D, and a suitable float and cut-off, G, is provided in said influx-pipe for the purpose of maintaining the carbureting-fluid at all times at a uniform height in the feed-box. The cut-off and float may be located in the feed-box, if desired.

The operation of the apparatus thus constructed will be readily understood. When one or more of the burners in the building are lighted the gas at once begins to flow through the meter, thereby setting in motion the registering-train shaft and the feed-wheel shaft geared thereto, as aforesaid. As the feed-wheel rotates, its buckets rise from the hydrocarbon in the feed-box, filled with the liquid, and, as they turn over, spill their contents into the chute or hopper $c^3$, from whence it is conducted through the pipe $c^4$ into the upper end of the carbureting-coil, and, passing down through the latter, becomes absorbed by the upwardly-flowing gas coming from the meter. The trap in the pipe $c^4$ prevents the rising of the gas from the carburetor into the feed-box.

It is obvious that as the amount of gas consumed is greater or less the movements of the meter, and consequently of the feeding-wheel, will be quicker or slower and the amount of hydrocarbon supplied to the carburetor correspondingly increased or diminished—a result not before accomplished. Therefore when one burner only is being used the meter moves quite slowly and causes the feed-wheel to move at a corresponding rate of speed and supply just enough of the carbureting-fluid to the carburetor to make the desired rate of saving and give the desired quality of light; but when the number of operating-burners is increased to fifty the movement of the meter is accelerated fifty times and the feed-wheel caused to feed fifty times the quantity of hydrocarbon, and so on through all the changes in the number of burners in use.

In order that the supply of hydrocarbon may neither be too great nor too small for the quantity of gas, it is only necessary to regulate the feed of the feed-wheel. This may be effected by changing the gears which connect the meter-shaft to the feed-wheel shaft, so as to make the feed-wheel rotate faster or slower upon a given movement of the registering-train of the meter, or by employing a larger or smaller feed-wheel, or one with buckets a greater or less distance apart, as will be readily understood.

For the purpose of indicating when more hydrocarbon is being supplied to the carbureting-coil than can be absorbed or taken up by

the gas, a short pipe, *a*, is connected to the lower end of the coil, with a glass bulb or reservoir, *a'*, attached to it. An accumulation of hydrocarbon in this bulb will indicate an excessive supply and call for a regulation of the feeding devices.

I preferably insert a glass section in front of the feed-box and another in the box or chamber containing the float and cut-off which controls the height of hydrocarbon in the feed-box, in order that the inspection of the workings of these parts can be readily had without opening them and exposing the hydrocarbon to the air and incurring the danger of fire while so doing.

The feed-wheel, chute, and float and cut-off may all be arranged in one box, if preferred.

I have shown herein but one embodiment of my invention; but it is evident that various modifications may be devised without departing from the principle of the invention.

The invention is not only available in carbureting illuminating-gas, but also in carbureting atmospheric air and other fluids.

Having thus described my invention, I claim as new—

1. In an apparatus for carbureting gas, the combination, substantially as described, of the gas-supply pipe, the meter arranged in said pipe, the carburetor, the pipe leading from the meter to the carburetor, the feed-receptacle for containing the carbureting-fluid, and feeding devices, as described, for positively lifting the carbureting-fluid from the feed-receptacle and discharging it into a pipe leading to the carburetor, with said last-mentioned pipe, and mechanism connecting the feeding device to the meter, whereby the former is driven by the latter.

2. In an apparatus for carbureting gas, the combination, substantially as described, of the gas-supply pipe, the meter arranged in said pipe, the carburetor, the pipe leading from the meter to the carburetor, the feed-receptacle for containing the carbureting-fluid, and the feeding-wheel in the feed-receptacle, having buckets for dipping up and lifting the carbureting-fluid and discharging it positively into the pipe leading to the carburetor, with said last-mentioned pipe, and mechanism connecting the feed-wheel to the meter.

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Witnesses:
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D. MACLEAN.