B. E. CHOLLAR.

Automatic Feed-Regulator for Carbureters.

No. 198,353. Patented Dec. 18, 1877.

Fig. 1.

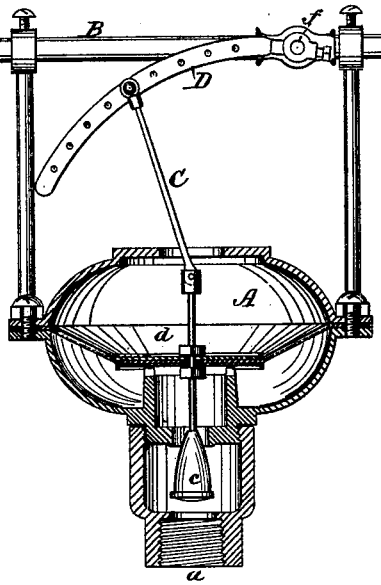


Fig. 2.

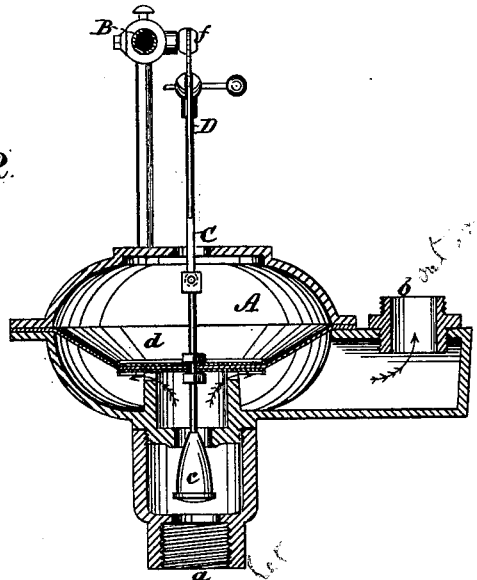
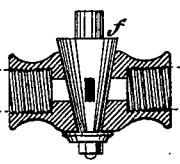


Fig. 3.



WITNESSES:

W. W. Hollingsworth

Edw. O. Byrn

INVENTOR:

B. E. Chollar

BY

ATTORNEYS

UNITED STATES PATENT OFFICE.

BYRON E. CHOLLAR, OF CHICAGO, ILLINOIS, ASSIGNOR TO SAFETY CARBURATOR COMPANY, OF SAME PLACE.

IMPROVEMENT IN AUTOMATIC FEED-REGULATORS FOR CARBURETERS.

Specification forming part of Letters Patent No. **198,353**, dated December 18, 1877; application filed October 24, 1877.

To all whom it may concern:

Be it known that I, BYRON E. CHOLLAR, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Automatic Feed-Regulator for Carbureters; and I do hereby declare that the following is 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 front view, with the gas-governor in vertical section. Fig. 2 is a vertical section of the device, taken in a plan at right angles to the section of the governor in Fig. 1. Fig. 3 is an enlarged sectional detail view of the hydrocarbon plug-valve.

My invention relates to a device for automatically regulating the feed of the hydrocarbon in carbureting devices. It is designed more particularly for regulating the feed of the hydrocarbon in carbureting ordinary city illuminating-gas at large public buildings, such as theaters, churches, hotels, &c., in order to enrich the quality of the gas just before it is consumed, and thus to secure a more economical consumption of the same, as well as a better light, by making a smaller amount of gas supply the requisite light by reason of its increased illuminating-power, resulting from the absorption of the rich hydrocarbon.

The object of my improvement is to render the carbureting of either air or gas uniform by making the automatic regulation of the flow of the liquid hydrocarbon dependent directly upon the flow of the gas, and to utilize all of the hydrocarbon employed.

To this end my invention consists in connecting the valve of any of the ordinary forms of automatic gas-governors directly with the valve or cock controlling the supply of hydrocarbon, so as to cause them to act in constant unison together, whereby the sensitiveness of both valves is always the same, and the respective flows of the gas and hydrocarbon always maintain a constant and uniform relation to each other independently of the carbureting apparatus, the proportion of hydrocarbon being constantly just that which that amount of gas can take up.

The invention also consists in apparatus for the adjustment of the devices to the varying temperature of the season and the pressure of gas in the mains; and also, further, in the adaptation of the valve of the governor to the valve or cock of the hydrocarbon-conduit, all as hereinafter more fully described with reference to the drawings.

A represents a common form of gas-governor, having an inlet, *a*, and an outlet, *b*, for the gas, the flow of which is regulated by a valve, *c*, attached to a rod depending from a flexible diaphragm, *d*, and arranged to move in the valve-chamber to increase, diminish, or entirely close the annular opening about the same through which the gas passes.

Just above the governor, upon suitable supports, is arranged a pipe, B, through which the volatile hydrocarbon is fed to the carbureting apparatus. This pipe B communicates at one end with a supply of the hydrocarbon, placed outside of the building for immunity from fire, and, at the other end, with the carbureting apparatus, while the gas-governor A is connected at its inlet with the pipe from the meter, and has its outlet end *b* also connected with the carbureting apparatus. The form of carbureting apparatus (not shown) may be varied, but that which I prefer is a simple coil of pipes, the lower end of which is connected with the outlet from the gas-governor, while the upper end of said coil is connected with the hydrocarbon-pipe B.

Now, as the gas passes up through this coil from the governor, the hydrocarbon passes down through the same in contact with the gas, and imparts thereto its rich illuminating properties.

To control automatically the amount of hydrocarbon admitted in constant proportion to the flow of gas, (which itself varies with the number of burners,) I cut an opening in the upper portion of the outer shell, and attach, in accordance with my invention, to the upper portion of the valve, above the diaphragm, a connecting-rod, C, by means of a pivoted joint. The upper portion of this rod C, I then attach to a lever, D, which latter is rigidly connected with and operates a valve or cock, *f*, in the pipe B, which cock controls the flow of the hydrocarbon to the carbureter. Now,

as the valve of the automatic governor rises and falls in proportion to the flow of the gas consumed, it causes, by reason of the rod C and lever D, the cock of the hydrocarbon supply to correspondingly open or close in unison, and proportionally regulates the amount of hydrocarbon admitted to the carbureter.

Under the different temperatures of the different seasons different amounts of the hydrocarbon will be taken up by the gas, the latter taking up a larger quantity in hot weather and a smaller quantity in cold weather, and to adapt the device to this change the lever D is perforated, and the end of the rod C arranged to be adjusted farther from or closer to the cock, to admit a larger or smaller supply of hydrocarbon to the carbureter. In making the adjustable connection, I curve the lever D to an arc, struck by the rod C, as a radius, when the governor-valve is up or closed. This enables me to connect the rod C directly to the lever throughout the several adjustments, and thus obviates the necessity of an additional joint and connecting-rod.

In order to secure a correct result in thus combining the gas-governor valve and the hydrocarbon-valve, it is necessary that they should both bear a constant relation to each other, and to this end I have constructed the governor-valve in a paraboloidal form, which gives for an equal movement of the valve equal increase or decrease of areas through which the gas flows—that is to say, a movement of the valve one-quarter of its length opens or closes the inlet areas one-quarter, and so on. In adjusting the hydrocarbon valve or cock *f* to the same principle of equal movement for equal areas of flow, I make the orifice square or rectangular. This square-orificed plug valve or cock and paraboloidal form of governor-valve, having this interrelation, I prefer as being the most practical form; but I do not confine myself to the same, as any construction and relation of one valve to the other which give a proportional flow of the hydrocarbon for a given flow of the gas will serve the purpose.

In defining more clearly my invention, I would state that numerous analogous devices have been made tending toward the same result aimed at by me, and I therefore disclaim all such devices as operate upon the following principles—that is to say, all such devices in which the valve of the hydrocarbon-supply pipe is operated intermittently only by the rise and fall of a water-sealed gas-receiver, because there is here neither any direct constant unison of action nor constant relation between the flow of gas and oil, and hence only a remotely proportional flow of oil. I also disclaim such devices as regulate automatically the flow of gas and oil by so controlling the supply of gas to the burner as to make the varying heat the agency for said automatic regulation. I also further disclaim such devices as are dependent upon the level of the hydrocarbon for automatically regulating the feed of the same, it being obvious that there is here no relation between the flow of the gas and oil, but only the measurement of a certain volume of oil which the gas may or may not take up.

My invention, then, rests upon the distinctive principle of making the oil or hydrocarbon supply and the gas supply to maintain always a constant and direct relation to each other in their rates of flow, independently of any carbureting apparatus, and its merits are as follows: first, great simplicity and freedom from derangement; secondly, its general adaptability to any form of carbureter; and, thirdly, an exact, constant, and uniform relation in the flow of the oil or hydrocarbon to the flow of the gas.

It is obvious that, in carrying out my invention, any form of independent automatic governor for the gas and valve for the hydrocarbon may be used, so long as they are directly connected for a constant unison of action.

Having thus described my invention, what I claim as new is—

1. An automatic feed-regulator for carbureters, consisting of an independent automatic gas-governor, having its valve connected directly to and combined with the valve or cock of the hydrocarbon-pipe for a constant unison of action, whereby the respective flows of the gas and hydrocarbon are made always to maintain a constant and uniform relation to each other independently of the carbureting apparatus, substantially as described.

2. The combination, with the automatic governor-valve, of the connecting-rod C, the curved adjusting-lever D, and the attached hydrocarbon-supply valve *f*, substantially as and for the purpose described.

3. The gas-governor valve, made in paraboloidal form, connected to and combined with the hydrocarbon-valve, having a rectangular perforation, substantially as and for the purpose described.

The above specification of my invention signed by me this 22d day of October, 1877.

BYRON E. CHOLLAR.

Witnesses:
EDW. W. BYRN,
SOLON C. KEMON.