J. T. & R. H. PLASS.

Apparatus for Carbureting Air.

No. 82,244. Patented Sept. 15, 1868.

Fig. 3.

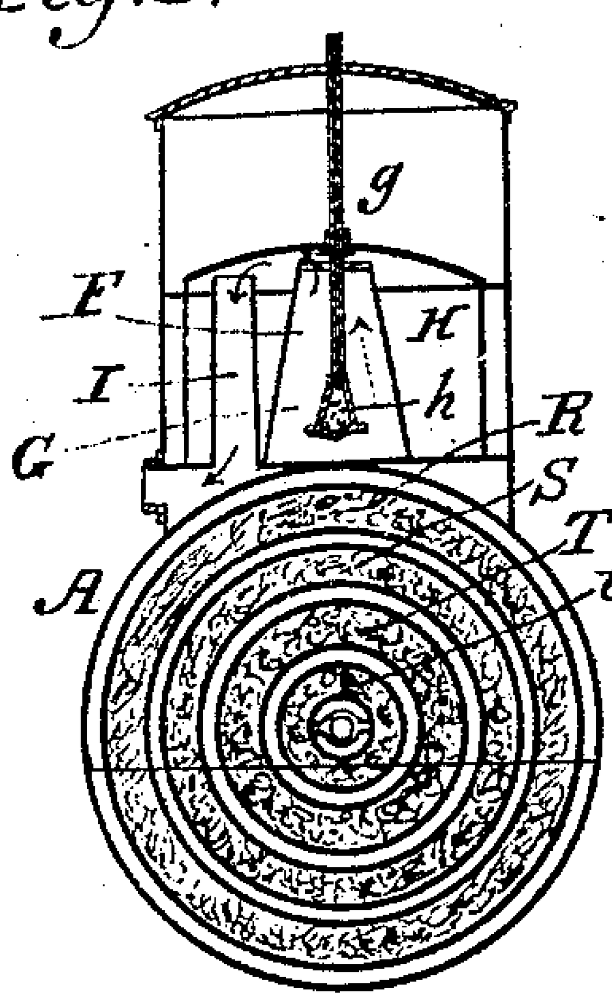


Fig. 4.

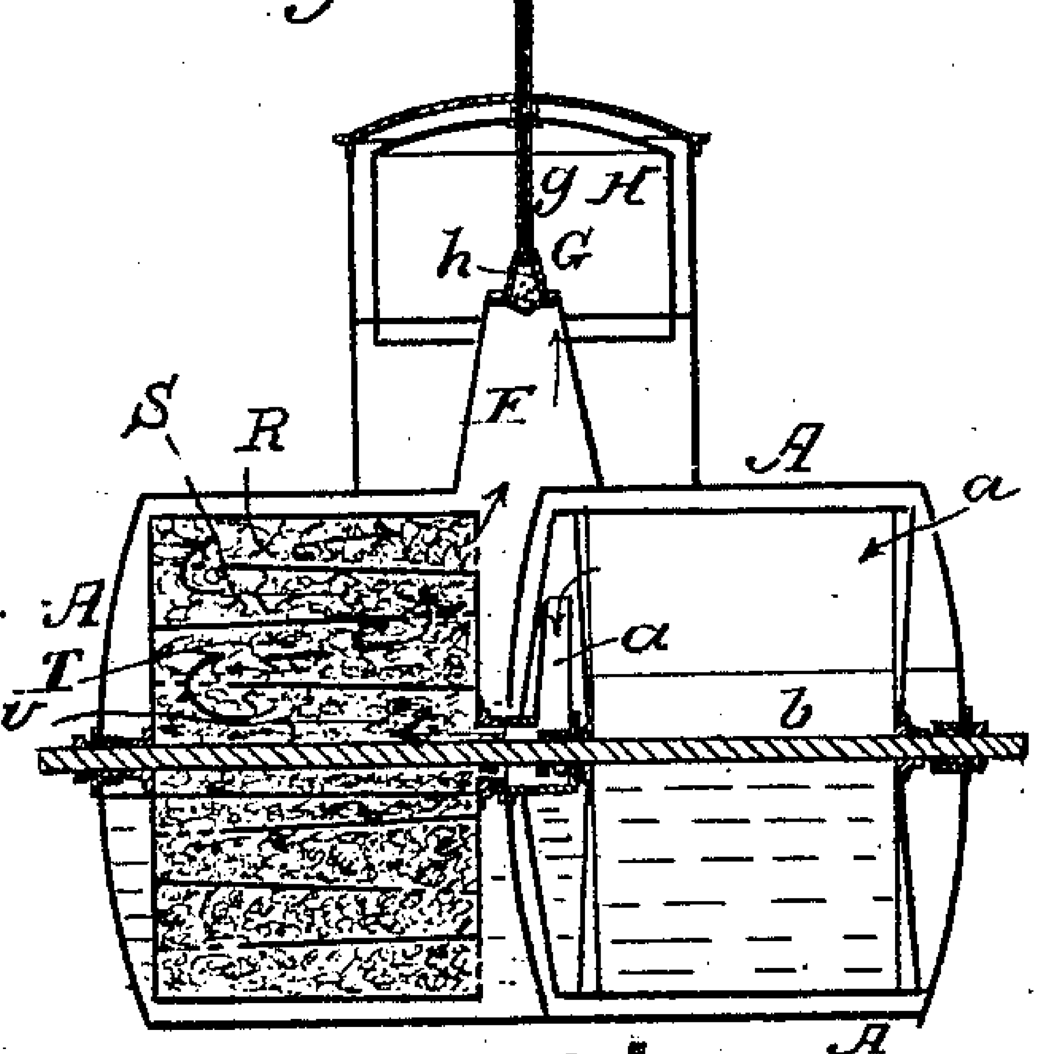


Fig. 1.

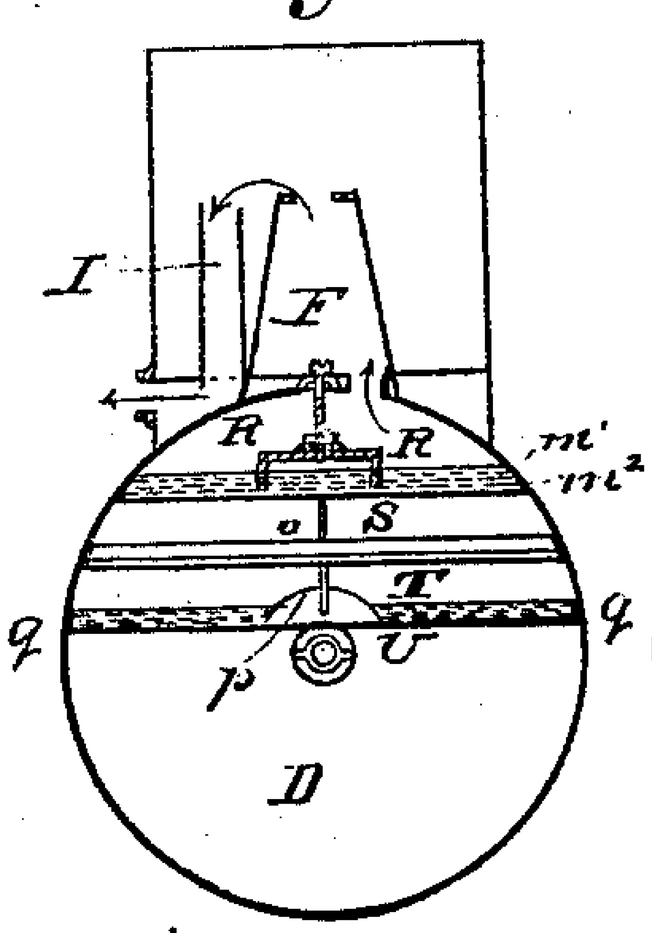


Fig. 2.

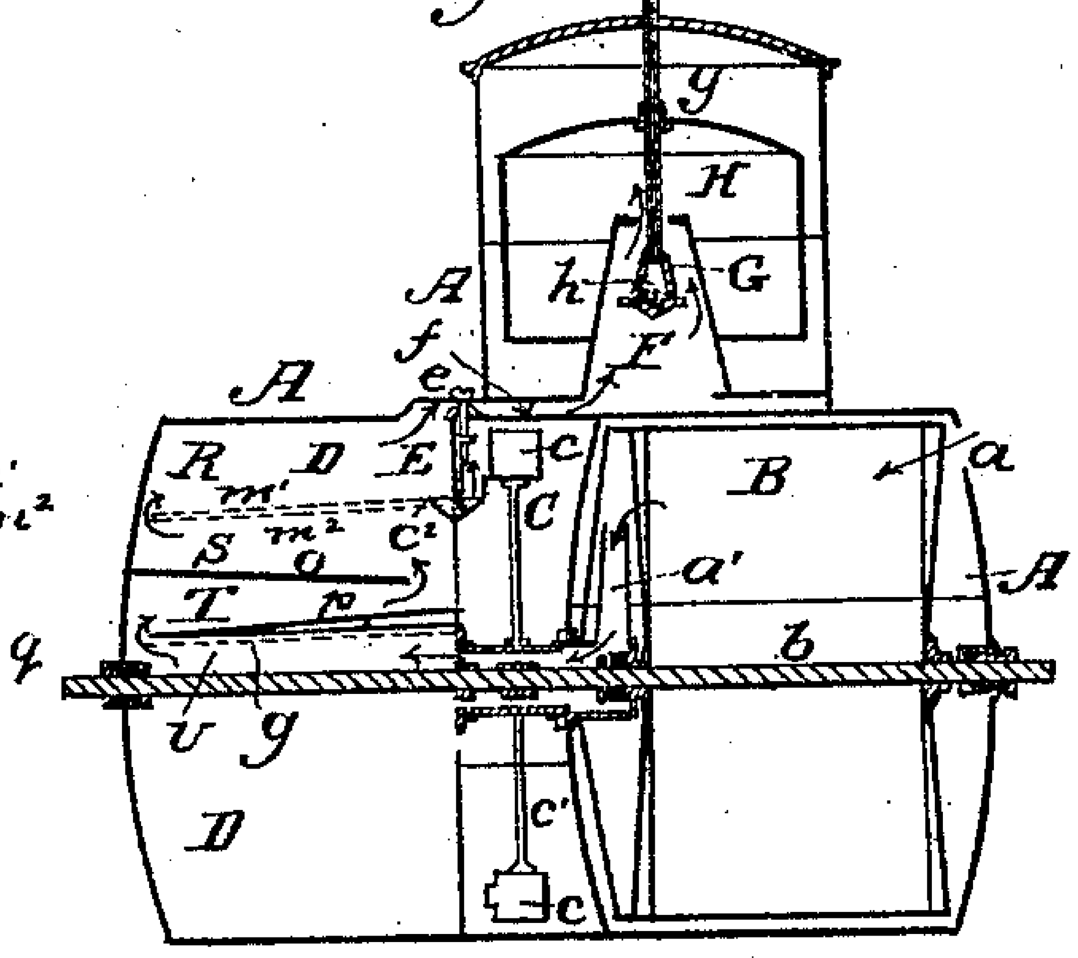


Fig. 5.

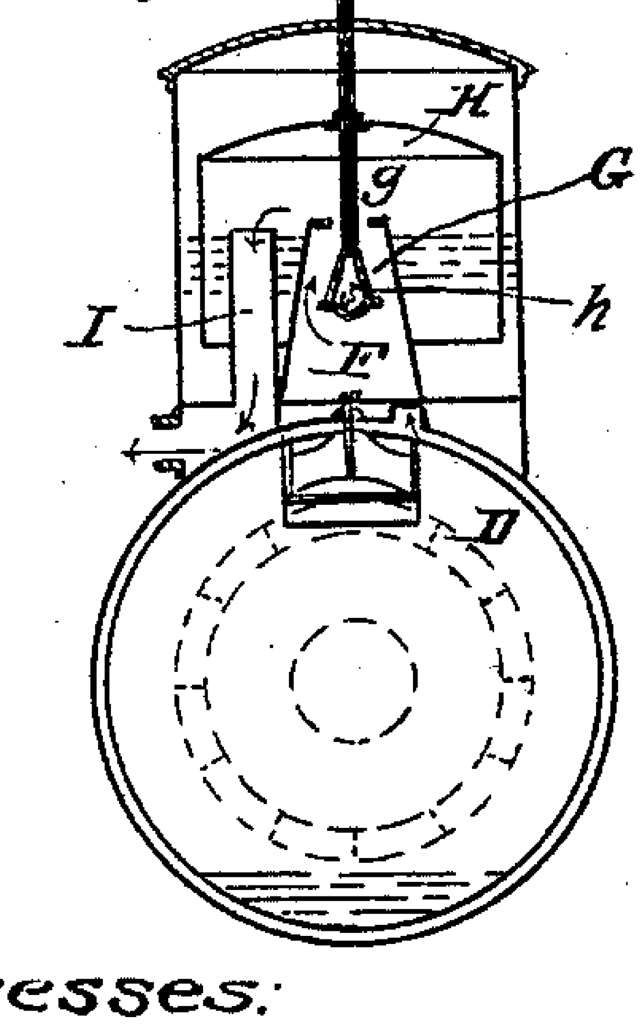
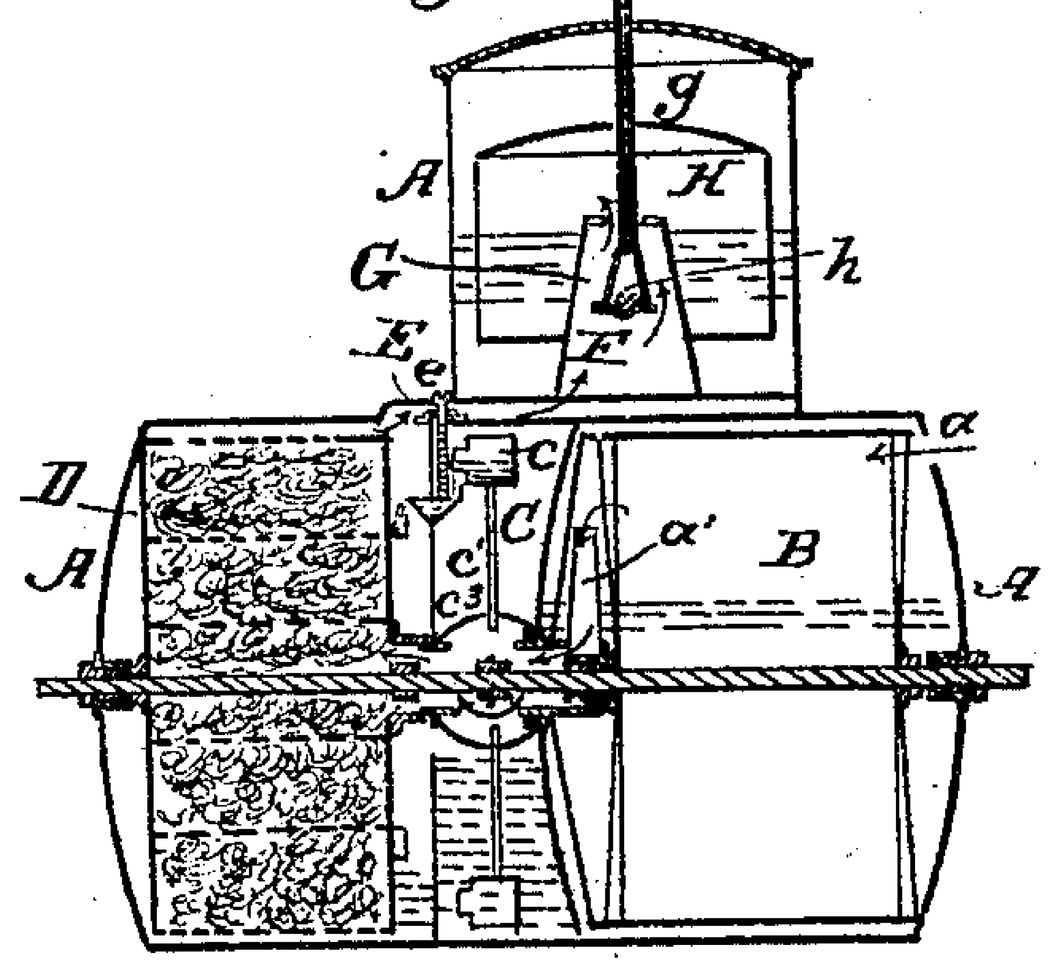


Fig. 6.



Witnesses:
Thomas D. Stetson
C. C. Livings.

Inventors:
John T. Plass
Reuben H. Plass

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHN T. PLASS AND REUBEN H. PLASS, OF NEW YORK, N. Y.

IMPROVED APPARATUS FOR CARBURETING AIR.

Specification forming part of Letters Patent No. **82,244**, dated September 15, 1868.

To all whom it may concern:

Be it known that we, JOHN T. PLASS and REUBEN H. PLASS, of the city and county of New York, and State of New York, have invented certain new and useful Improvements in Carbonizers, by which we mean apparatus for saturating air or other gas with the vapor of naphtha or other suitable hydrocarbon; and we do hereby declare that the following is a full and exact description thereof.

We will first describe what we consider the best means of carrying out our invention, and will afterward designate the points which we believe to be new therein.

The accompanying drawings form a part of this specification.

Figure 1 is a cross-section, and Fig. 2 is a central longitudinal section, of one form of our apparatus. Figs. 3 and 4 show the mode of using my weighted valve with another form of apparatus, not claimed by me as part of this invention. Fig. 5 is a cross-section, and Fig. 6 is a central longitudinal section, of our apparatus.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to Figs. 1 and 2, A is the exterior fixed casing. The main body is cylindrical, with a capacious dome on the top. The central portion is divided into three separate chambers, B C D. In the chamber B is a blowing-wheel, which may be exactly like the ordinary wheel of a gas-meter. The shaft of this wheel is indicated by *b*, and is turned by means not represented, which may be a weight and cord connected by suitable multiplying-gear. The wheel is partially immersed in water, glycerine, or other suitable fluid, as indicated, and the wheel is turned in such direction as to draw in air through the aperture *a* and to throw it out through the bent pipe a', which communicates with a central orifice, as represented.

All the above parts are well known in connection with mechanism or apparatus for carbonizing, and need not be more particularly described.

The central chamber, C, is of less capacity than the others. It affords space for revolving arms c', fixed on the shaft *b*, carrying buckets *c*. This chamber C is partially filled with naphtha, gasoline, or other volatile hydrocarbon, and at each revolution of the shaft *b* the buckets *c* take up a quantity of this liquid and pour it into the cup or trough c^2. A short tube, c^3, is fixed on the arms, so as to be concentric with the shaft *b* and to form a tolerably air-tight connection between the chambers B and D. The liquid is discharged into the trough c^2 and is presented on both sides of the partition—that is to say, a portion of the trough is in the chamber C and another portion is in the chamber D; and one or more orifices through the partition near the bottom of the trough allow the liquid to flow freely through. It follows that the liquid is maintained in the trough at such a level that the orifices are closed and the air cannot flow through these orifices from one chamber into the other. In other words, it forms a trap which allows the liquid to pass, but not the air.

The interior of chamber D is provided with perforated partitions and deflectors, which perform an important function, and the flues or passages R S T between these partial partitions or deflectors are all filled more or less tightly with a loose fibrous material known as "excelsior." This is a kind of fine shavings of wood commonly used for this general purpose of presenting volatile liquid to a passing current of air. Other fibrous matter, or even wire or the like, may be used instead of excelsior, if preferred; but we will described it as excelsior.

The partial partitions *m o p* prevent the air from flowing directly through the fibrous material in a straight line from the induction to the eduction orifices and compel it to traverse backward and forward through the extended flues R S T. These flues, which we term "return-flues," compel the air to traverse the length, or nearly the length, of the chamber horizontally in one direction, and then to return in the same manner; but each return is higher than before. We have represented only two traverses and returns; but there may be three, or ten, if desired.

The flues, it will be understood, are all filled with the fibrous shavings termed "excelsior," (shown in Figs. 3 and 4,) or with other material which is opened, and which presents a great surface for the evaporation of the volatile fluid. We prefer to incline the plates or partial partitions *m o p*, which form these flues R S T, as represented. These may be all perforated, or they may be all tight. In the drawings the uppermost inclined partition is double, and both are perforated, as indicated by m' m^2. The next lower partial partition is solid or tight, as indicated by *o*. The next lower is apparently two thicknesses, the uppermost, *p*, being tight and the lowermost, *q*, being perforated. This latter construction is, in fact, only an optical effect. It is an effort at showing the partition in two positions. By referring to Fig. 1 it will be seen that the partition is raised in the middle. This raised part is solid or tight, as indicated by *p*, while the flat or lower part is perforated, as indicated at *q*. All these partially-inclined partitions may be perforated, as before remarked, and the series may be extended lower below the shaft, if preferred, care being taken in such event to conduct the incoming air to or below the lowermost by a flue, which may lead vertically down just within the evaporting-chamber D, as will be obvious. It will be observed that in this arrangement the fresh liquid is supplied to the uppermost parts of the excelsior to which the air is last presented, and that as the work proceeds the hydrocarbon moves down by gravity, aided by capillary attraction, to the drier parts of the excelsior in the lower flues—that is to say, the excelsior adjacent to the partitions m' m^2 is very wet, while the excelsior adjacent to the partition or partitions *p q* is dry or nearly dry. It follows from this arrangement that gravity is available to aid in the distribution of the hydrocarbon; that the air most saturated is presented to the newest received material, and that the air least saturated and the most thirsty for vapor is presented to those parts of the hydrocarbon which are the least evaporizable. It follows that the operation is conducted with great uniformity; that the air is very thoroughly saturated, and that the hydrocarbon is very thoroughly evaporated, the least volatile parts, as well as the most volatile, being evaporated in passing down through the apparatus.

When in any case excess of the liquid shall be supplied it will accumulate in the lower part of the chamber D. It occasions no particular inconvenience there. When it has filled up that part of the chamber to a sufficient height it will flow over into the middle chamber, C.

A gate or sliding stop, E, is provided, in connection with the trough c^2, adjustable from the outside of the apparatus by means of the thumb-screw *e*. By adjusting this stop E up or down, so as to partially close the communication for the liquid between the chamber C and the chamber D, the flow of the hydrocarbon liquid from the chamber C into the chamber D may be restrained at pleasure. In case its flow is very materially retarded in this manner the liquid will fill that part of the trough within the chamber C to overflowing, and it will overflow in consequence of the repeated accessions of liquid brought up by the buckets *c*. This flowing over will produce no effect. The restrained flow of the hydrocarbon liquid through the orifices into the chamber D will have the effect to moisten the excelsior in the chamber D to only a limited extent. That in the upper portion of the chamber will be tolerably wet. That in the lower part in the chamber will be drier by reason of its evaporation as it descends. By means of the adjustable stop E the quantity may be so regulated as to insure the complete evaporation of all the liquid which flows into the upper part of the chamber D. By reason of the fact that none of the liquid is allowed to pass down and accumulate in the bottom of the chamber D, but is all evaporated in its descent, and by reason of the fact that the liquid is dipped up by the buckets *c* and presented in small quantities in the manner represented, it follows that the least volatile as well as the most volatile parts of the liquid are entirely evaporated as each increment is received in the chamber D, and that the cold produced by the evaporation has no effect on the liquid remaining in the bottom of the chamber C.

Ordinary carbonizers perform with a gradually-decreasing effect when they are run for a long period. This may be due in part to two facts: first, the evaporation during the earlier period of the most volatile portion of all the liquid, and second, to the cooling of the entire mass of liquid by the continued and rapid evaporation. My invention avoids both these evils, as will be obvious. The air, after having become sufficiently saturated with the vapor of hydrocarbon, flows out through the passage *f* into the dome-shaped chamber F, and thence upward through an annular space around a hollow stem, *g*, into the gasometer or floating gas-holder, H, which floats on water, glycerine, or other fluid in the dome or upper part of the casing A, and from thence flows downward through the passage I, Fig. 1, and is conducted away to be burned through suitable pipes. (Not represented.) The motion of the carbonized air or other gas is indicated by arrows in the figures.

A conical valve having a capacious hollow interior is fixed on the lower extremity of the hollow stem *g*, as indicated by G. This valve fits tightly and stops the hole through which the gas flows upward from the chamber F whenever the gasometer or gas-holder H rises to its highest extent. It serves as a regulating-valve, and the pressure at which it will close or partially close the passage for the discharge of the gas or carbonized air may be varied at will by introducing small shot *h* or analogous small weights through the hollow stem *g*. It will be observed that the upper end of the stem *g* is open to the atmosphere, the stem sliding freely through a central hole in the top of the dome. Now, by introducing shot, one after another, through this hollow stem, and allowing them to accumulate in the capacious interior of the conical valve G, we can load the apparatus so as to require a pressure of five-tenths of an inch of water, or six-tenths, or any other pressure which may be found desirable under the particular circumstances in which the apparatus is used. We esteem this adjustability an important feature of our apparatus. Care should be used in introducing the shot not to exceed a proper limit. In case such a mistake is made the shot may be emptied by reversing the valve and its connections after taking the structure partially in pieces.

The several parts are put together by tight joints in any approved manner.

The volatile hydrocarbon fluid is dipped up in a central chamber and discharged through the trap c^2 into the evaporating-chamber D in about the right quantities; but in the form shown in Figs. 3 and 4 of the apparatus it is not very essential that the liquid be entirely evaporated in descending through the flues. In case all is not evaporated it will ultimately, after thoroughly saturating the fibers and material in the flues, accumulate in the bottom of the chamber D. It will there form a reservoir which will wet the exterior of the revolving mass, and thus, in case of any possible irregularity in the supply, will insure a perfect saturation of the exterior, and consequently an approximate saturation of the interior, of the flued construction.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is as follows:

1. The gate E, in combination with the fluid-trap c^2, constructed as described, for regulating the supply of hydrocarbon to the evaporating-chamber and returning the surplus to the reserve-chamber, substantially as set forth.

2. The tubular stem of the hollow cone-valve G, for the insertion of shot or other suitable weights for adjusting the pressure in the gasometer, substantially as set forth.

In testimony whereof we have hereunto set our names in presence of two subscribing witnesses.

JOHN T. PLASS.
REUBEN H. PLASS.

Witnesses:
PETER COUTANT,
JOHN E. COUTANT.