

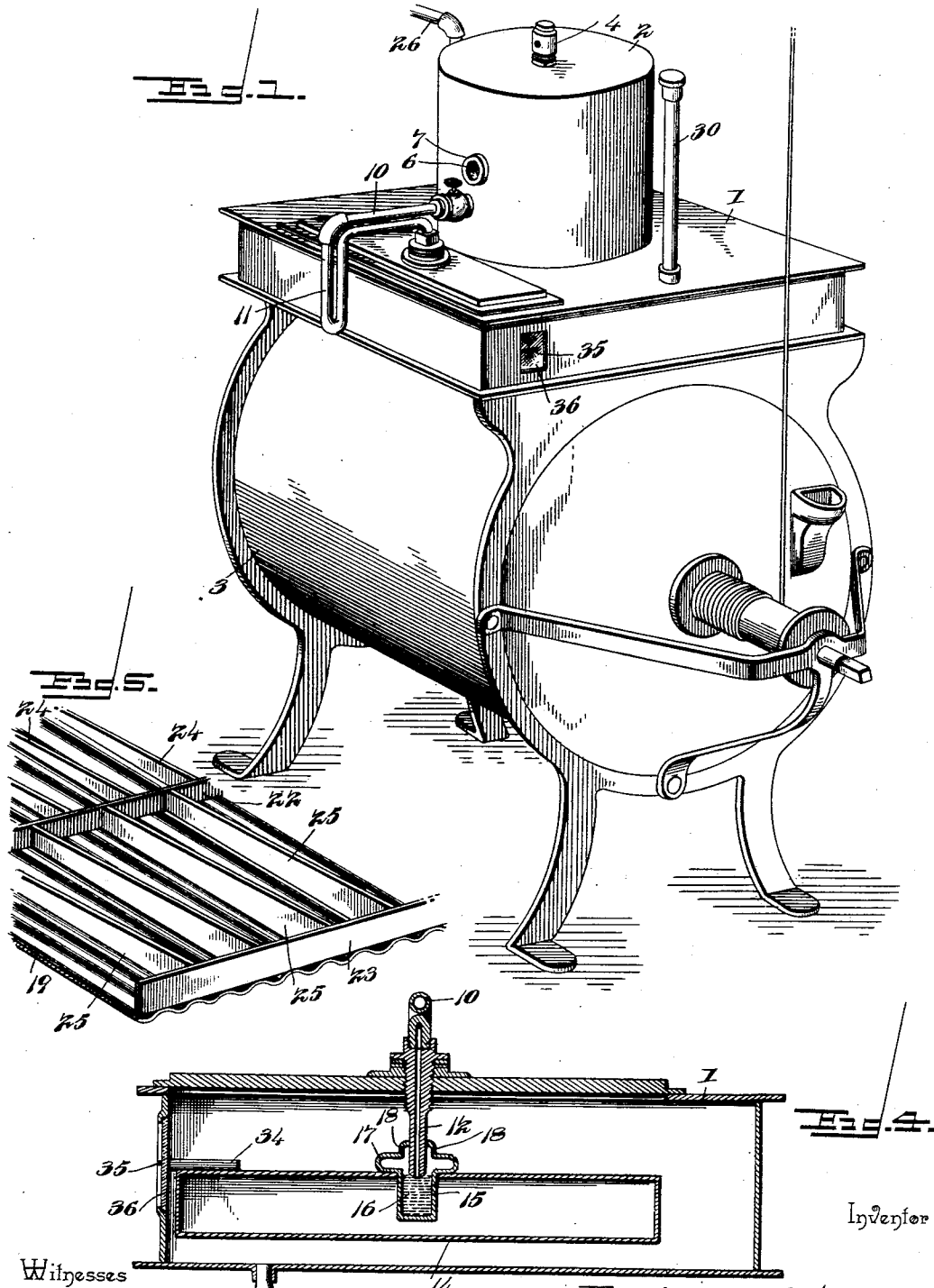
(No Model.)

2 Sheets—Sheet 1.

F. H. SHAVER.
CARBURETER.

No. 587,867.

Patented Aug 10, 1897.



Witnesses
E. B. Kilby
U. B. Kilby

By *his* Attorneys, *Frederick H. Shaver*

C. A. Snow & Co.

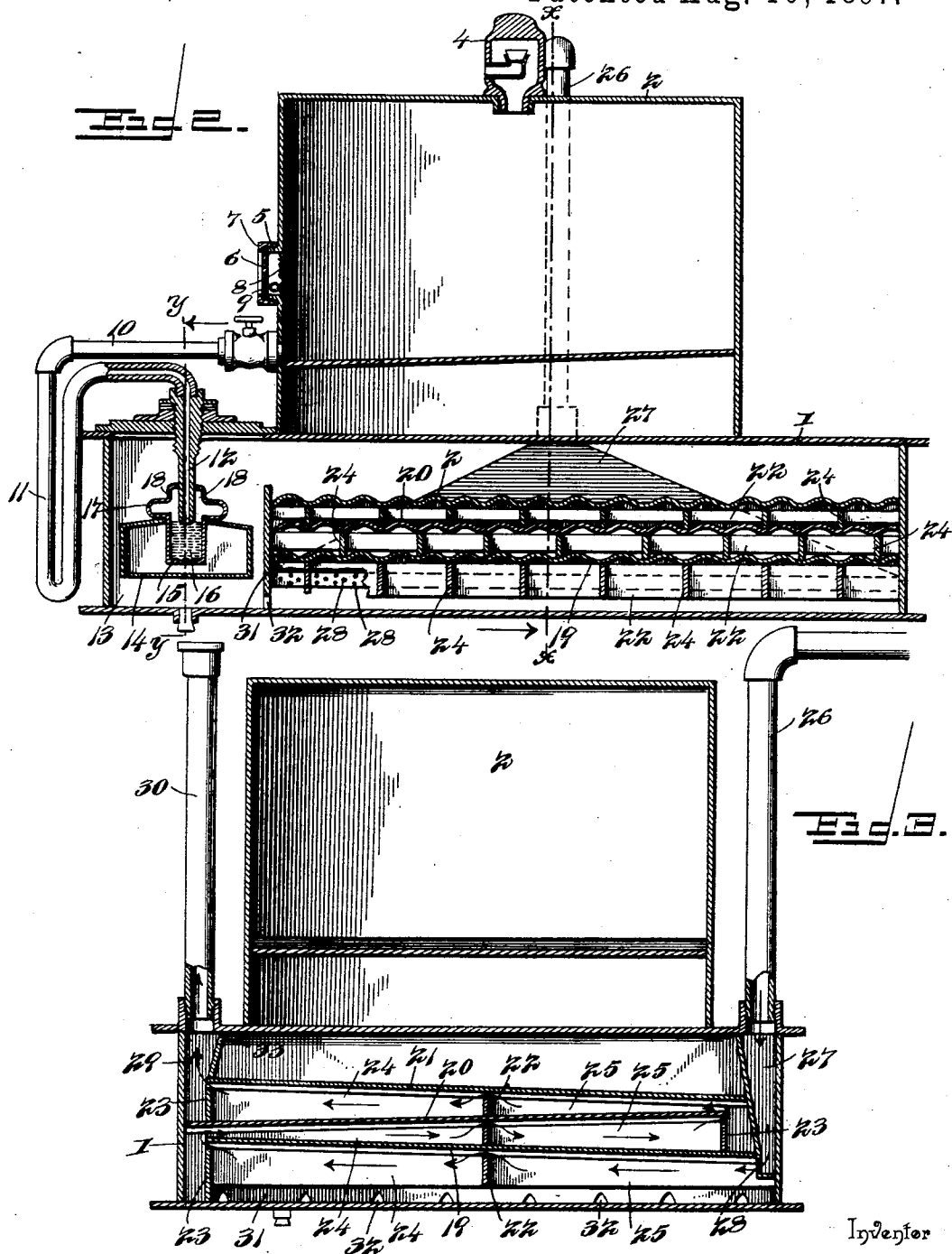
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By *Two* Attorneys,

Frederick H. Shaver

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UNITED STATES PATENT OFFICE.

FREDERICK H. SHAVER, OF CEDAR RAPIDS, IOWA.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 587,867, dated August 10, 1897.

Application filed June 20, 1896. Serial No. 596,334. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. SHAVER, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented a new and useful Carbureter, of which the following is a specification.

This invention relates to gas-machines for carbureting air, in which the latter is forced through the hydrocarbon. When the air is permitted to stand in the carbureter and the latter is not in operation, it becomes so enriched that when the gas is first lighted it smokes, the surplus and unconsumed carbon escaping and settling upon draperies, walls, and otherwise being objectionable, and to obviate this smoking mixers are resorted to for tempering the overcarbureted air.

By this invention the gas is consumed as fast as made, thereby preventing any standing in the carbureter when the latter is resting, and, moreover, the oil or hydrocarbon is supplied to the carbureter in such quantities as used, thereby preventing stratifying of the oil, as happens when the carbureter is made to answer as a storage-chamber for a bulk of oil. Hence a gas of uniform quality and illuminating power is obtained and a steady light is the result.

A further purpose of the invention is to secure a distribution of the air to be carbureted over the carbureting-plates, even though the machine should be tipped or set so as to throw the plates out of the horizontal, whereby a thorough enriching of the air with carbon is attained under all conditions.

A still further object of the invention is to maintain a given level of hydrocarbon in the carbureter, the supply being automatically controlled and regulated according to the consumption of the gas.

Other objects and advantages are contemplated and will appear as the nature of the invention is understood; and to this end reference is to be had to the following description and the drawings hereto attached, forming part of this application.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure

of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a gas-machine constructed for attaining the objects of this invention. Fig. 2 is a transverse section of the storage-tank and carbureter proper. Fig. 3 is a longitudinal section on the line X X of Fig. 2, looking in the direction of the arrow. Fig. 4 is a longitudinal section of the carbureter on the line Y Y of Fig. 2, looking to the left, as indicated by the arrow. Fig. 5 is a detail view of a carbureting-plate.

Corresponding and like parts are referred to in the following description and indicated in the several views of the accompanying drawings by the same reference-characters.

The machine comprises, essentially, three parts—a carbureter 1, storage-tank 2 for replenishing the carbureter with a hydrocarbon as the latter is consumed, and a pump or blower 3 for forcing a current of air through the carbureter to become laden with carbon on its way to the point of consumption or use. The device 3 for generating a current of air may be a fan-blower, pump, or compressor, such as generally used in machines of this character, and is illustrated to show a means for supplying the air to the carbureter to produce the gas which is subsequently used for illuminating or other purposes.

The storage-tank 2 may be of any desired shape and capacity, and is located at a higher level than the carbureter, so that the oil will feed therefrom by gravity. A valved vent 4 has connection with the top of the tank 2 to prevent the formation of a vacuum therein and the escape of gas in the event of the pressure within the tank exceeding the pressure of the surrounding atmosphere. This vent also provides a convenient means of recharging the tank when the latter is nearly exhausted or when it is required to refill the same. An observation-opening is provided in a side of the tank and is surrounded by a threaded collar 5, which is closed by glass 6 or transparent plate, and which is held in place by a ring 7, making screw-thread connection with the collar 5. The opposite end of the collar is protected by a guard 8 of wire and whose sole purpose is to retain within the collar a buoyant indicator 9, by means of

which the level of the oil can be readily determined. When the level of the oil in the tank is above the observation-opening, the indicator 9 will occupy a position at the top of the opening or collar, and when the level of the oil falls below the top of the observation-opening the indicator will fall and designate the exact level, provided the latter is within range of the limits of the observation-opening, thereby making known when the tank is nearly empty and should be recharged. The oil from the tank passes into the carbureter through a pipe 10, trap 11, and nozzle 12, the latter extending into the carbureter and making a tight connection therewith.

The carbureter comprises a shallow case having a chamber 13 at one end which contains a proper amount of hydrocarbon to successfully carburett the air. A float 14 is placed in the chamber 13 and is provided with a cup 15, which contains mercury 16 for sealing the discharge end of the nozzle 12 when the chamber 13 is supplied with oil to the predetermined level. The cup 15 has an expansion-chamber 17 near its upper end, which prevents the loss of the mercury in the event of the carbureter being tipped or suddenly jarred, and this chamber 17 contains a small amount of the hydrocarbon, which prevents the oxidizing of the mercury and maintains the same in condition for effective service at all times. A series of openings 18 are formed in the sides of the cup above the chamber 17 for the escape of the hydrocarbon into the chamber 13. The nozzle 12 works loosely through the upper end of the cup and its lower end is made conical and is adapted to dip into the mercury 16 and is sealed by the latter so as to shut off the supply of oil when the carbureter is properly charged.

A series of carbureting-plates 19, 20, and 21 are located in the casing and occupy the space formed between the inner wall of the chamber 13 and the opposite wall of the case and extend parallel with the said chamber. The plates 19 and 21 extend parallel and incline slightly throughout their length. The middle plate 20 inclines in an opposite direction to the plates 19 and 21 and is secured at one end to a side of the casing and is free at its opposite end, whereas the plates 19 and 21 make a close joint with the case at the ends contiguous to the free end of the plate 20. By reason of this disposition of the plates the air is caused to travel in a zigzag or tortuous path through the carbureter, as indicated by the arrows in Fig. 3. The plates 19, 20, and 21 are fluted or corrugated in the direction of their length, and each is provided on its lower side with strips 22 and 23, extending at right angles to the flutes or corrugations and which touch the latter and are secured thereto at the ridges or crests, thereby providing a series of spaces corresponding to the position of the channels or grooves. The strips 22 are located intermediate the ends of the plates, and the strips 23 are placed

at one end. Strips 24 extend parallel with the corrugations or flutes, and their ends touch the inner sides of the strips 22 and 23. Other strips 25 extend from the strips 22 to the opposite end of the plates and are arranged to come opposite the spaces formed between the strips 24. On reference to Fig. 5 it will be seen that the strips 24 and 25 alternate, the strips 24 coming opposite the spaces formed between the strips 25, and the purpose of this disposition of the strips is to distribute the air over the carbureting-plates in its passage through the carbureter. The strips 24 and 25 prevent the oil rushing in a body to one side of the carbureter should the machine from any cause become tipped.

The air is supplied to the carbureter by means of a pipe 26 and communicates with a flaring nozzle 27 at one end of the carbureter, this nozzle gradually widening from its upper to its lower end, as shown most clearly in Fig. 2, and projecting a short distance below the lowermost plate 19 and having a series of perforations 28 in its inner side immediately below the plate 19, so as to discharge the air into the carbureter below the series of carbureting-plates. A gathering-nozzle 29 is located at the opposite end of the carbureter and receives the enriched or carbureted air and directs the same to a discharge-pipe 30, to which the service-pipe is connected. The chamber 13 is divided from the compartment in which the carbureting-plates are located by means of a partition 31, which latter is formed in its lower edge with a series of notches 32, through which the hydrocarbon passes from the chamber 13 into the compartment in which the air is carbureted. In order to equalize the pressure throughout the upper portion of the carbureter, so as to maintain a given level of oil in the chamber 13 and the compartment in which the carbureting-plates are located, the inner wall of the part 29 is formed with an opening 33.

In order that the level of the oil in the carbureter may be indicated without exposing the machine to the danger of fire, an indicator consisting of a magnet and a needle is employed, and, as shown, the magnet 34 is applied to the float 14 and rises and falls with the latter, and a needle 35 is located exterior to the case and follows the movements of the magnet, thereby determining the level of the oil by reference to suitable marks or graduations provided on the outer side of the case. When the tank is constructed of sheet iron or steel, it is essential to the successful operation of the indicator that a panel 36, of non-magnetizable material, such as copper or brass, be secured in an opening provided opposite to the magnet 34, so that the needle 35 may be attracted by the magnet and follow the movements of the latter.

The position of the magnet and needle may be reversed and the same results be attained—that is, the needle may be in the shape of a

bar or strip and secured to the float and the magnet may be located exterior to the case. This is an obvious construction, but is not nearly as satisfactory as the construction illustrated.

Provision is had for varying the level of the oil in the carbureter, and this is accomplished by having the nozzle 12 adjustably connected with the carbureter, packing 37 being interposed between the shoulder of the nozzle and the gland attached to the top of the carbureter, so as to insure a tight joint to prevent escape of the gas.

Having thus described the invention, what is claimed as new is—

1. In a carbureter, the combination of a float, a cup carried by the float and containing a sealing fluid, and having a portion between its ends enlarged to provide a closed expansion-chamber, and having openings in its sides above the expansion-chamber, and a nozzle of smaller diameter than the cup extending therein and closed by the sealing fluid and operating through an opening provided in the upper end of the cup, substantially as set forth.

2. In a gas-machine, the combination of a case, a series of carbureting-plates oppositely inclining and having passages at their higher ends, and longitudinal and transverse strips interposed between the plates and corresponding to the space formed between them, the longitudinal strips touching adjacent plates at their upper and lower edges, and the transverse strips having spaces at intervals along their top and bottom edges, substantially as and for the purpose set forth.

3. In a gas-machine, the combination of a case, a series of superposed carbureting-plates located within the case and oppositely inclining and having spaces at their higher ends and longitudinally fluted or corrugated, and transverse strips placed between the plates and touching the crests or ridges of the flutes thereof and providing spaces intermediate of the engaging points, substantially as and for the purpose set forth.

4. In a gas-machine, the combination of a case, a series of carbureting-plates fluted or corrugated, transverse strips located at one end and intermediate the ends of the plates, and longitudinal strips disposed in parallel relation upon opposite sides of the intermediate transverse strips, the strips upon one side of the intermediate transverse strips coming opposite the spaces between the other longitudinal strips, substantially as and for the purpose set forth.

5. In a gas-machine, the combination of a case, a series of carbureting-plates located therein, a flaring nozzle at one end of the case for distributing the air in fine jets throughout the extent of the carbureting-plates, and a flaring gathering-nozzle at the opposite end of the case for collecting the carbonized air, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FREDERICK H. SHAVER.

Witnesses:

JOHN H. SIGGERS,
THEODORE DALTON.