(No Model.)

S. J. ANTHONY & E. J. FROST.

Apparatus for Producing Illuminating Gas or Vapor.

No. 238,020. **Patented Feb. 22, 1881.**

FIG. 1.

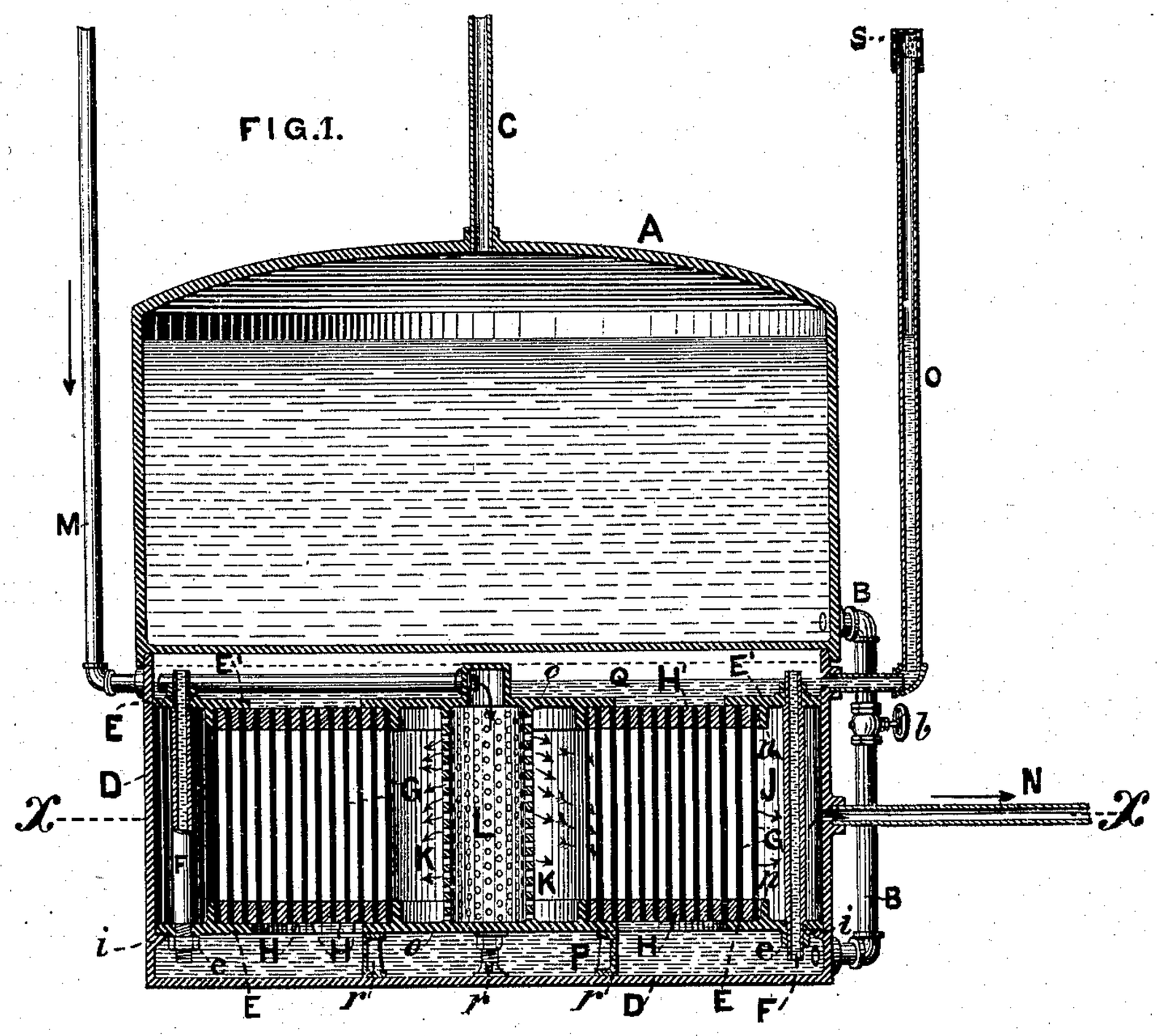
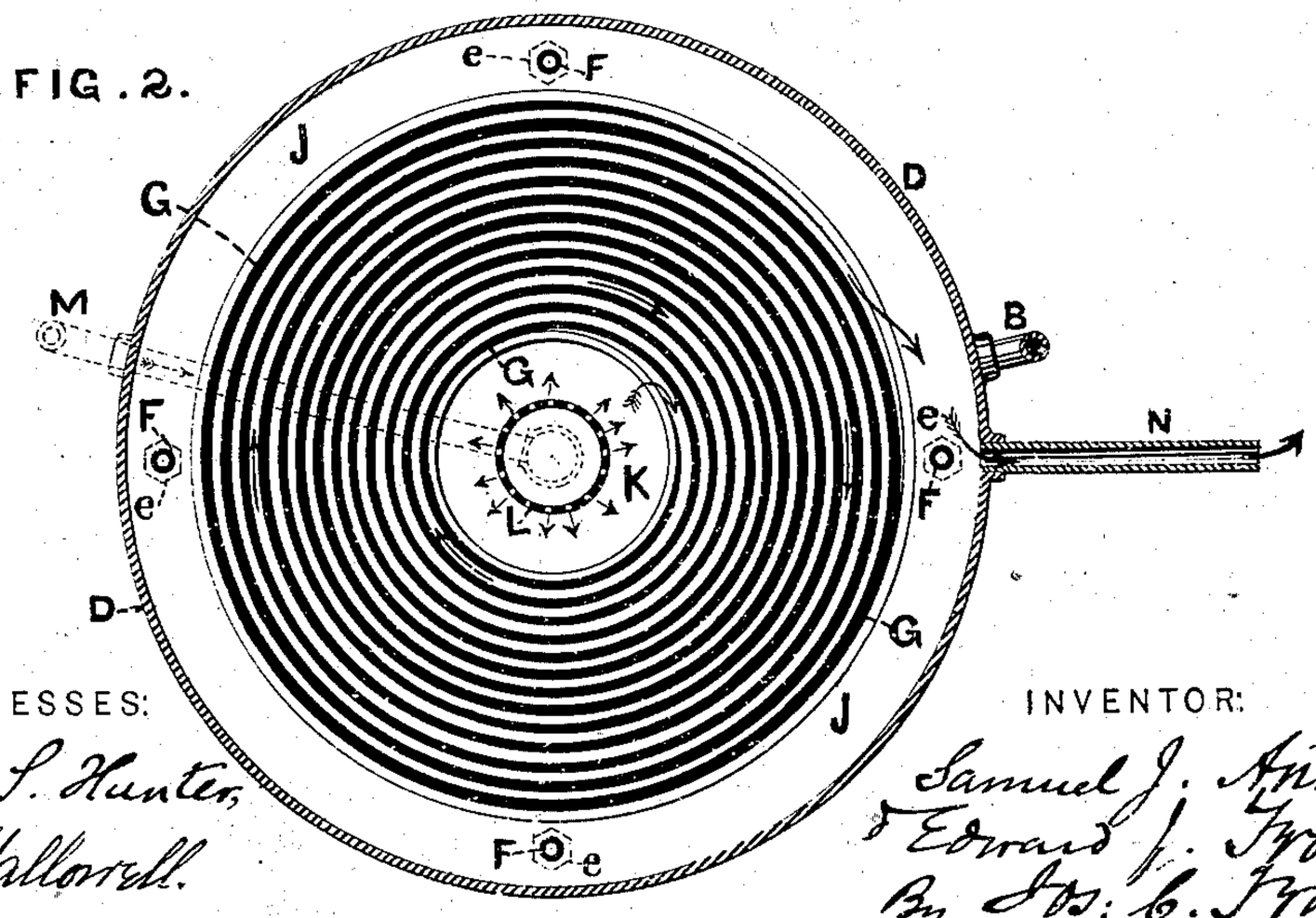


FIG. 2.



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UNITED STATES PATENT OFFICE.

SAMUEL J. ANTHONY AND EDWARD J. FROST, OF PHILADELPHIA, PA.

APPARATUS FOR PRODUCING ILLUMINATING GAS OR VAPOR.

SPECIFICATION forming part of Letters Patent No. 238,020, dated February 22, 1881.

Application filed May 15, 1880. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL J. ANTHONY and EDWARD J. FROST, both of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Producing Illuminating Gas or Vapor, commonly known as "Carbureters," whereof the following is a specification, reference being had to the accompanying drawings.

Of these, Figure 1 represents a vertical section through the center of the apparatus, and Fig. 2 is a horizontal section on the line *x x* of Fig. 1.

Our invention relates to that class of so-called carbureters in which a current of air is forced over surfaces saturated with a volatile hydrocarbon, and the inflammable vapor thus obtained is conducted through pipes to the burners.

The improvements consist in constructing the evaporator of wood veneering disposed in closely-approximating and uniform surfaces, with regular air-passages throughout.

They further consist in so constructing the evaporator as to prevent direct contact of the air-current with the body of liquid in the evaporating-tank, and only permitting contact between the air-current and such fluid as has passed through the capillary material and has exuded upon its surface, thus forming a dry carbureter.

They further consist in a device by which both ends or edges of the capillary material are kept immersed in the fluid, whose level is maintained by an automatically-regulated feed.

In the drawings, A, Fig. 1, represents the reservoir or tank of fluid, preferably the hydrocarbon known as "gasoline," the supply-pipe being indicated at C. Below this tank is placed the evaporating-vessel D, preferably a cylindrical tank of metal, into which the flanges E E′ fit tightly, so as to form close joints with the sides of the vessel. The lower flange rests upon an annular shelf upon the inside of the vessel. The flanges E E′ are turned true upon their upper and lower surfaces, respectively, and are each provided with annular ribs *n n′*, the interior surfaces of which are also turned true.

Resting upon the lower flange, E, and fitting tightly between the ribs *n n′* of both flanges, is placed the evaporator G. This is constructed of a continuous sheet of thin veneering of gum, poplar, or other porous wood, coiled spirally in such a manner as to leave a regular and continuous air-passage from the inner to the outer end of the spiral, contact between the coils being prevented by the interposition of strips H H′ of wood veneering at each edge. The sheet G being tightly wound by machinery and the strips H H′ being interposed during the process of winding, a close joint is formed at each edge. The core of the coil consists of the cylinder L, having annularly-ribbed disks *o o* at each extremity. The outer surfaces of the ribs and the faces of the disks are turned true, so as to allow the formation of a close joint with the evaporator G.

The cylindrical vessel L between the disks is provided throughout with small openings for the equal distribution of the air-current, which is supplied from the pipe M, the air-current being produced by any of the well-known devices in use for that purpose. The lower disk, *o*, of the vessel is supported by feet *r r*. An open space is left within the evaporating-tank above and below the evaporator G, and communication is maintained between these open spaces through the tubular bolts F F connecting the flanges E E′.

A feed-pipe, B, provided with a cock, *b*, connects the reservoir A with the evaporating-tank.

A pipe, O, having a cap, S, with minute perforations serving as a vent, is placed near the top of the evaporating-tank, as shown.

The spiral air-passage of the evaporator G leads from the interior of the open space K, surrounding the perforated cylinder L, into the free annular space J, inclosed laterally between the evaporator G and the sides of the evaporating-tank, and at top and bottom by the annular flanges E E′. From the annular space J an exit-pipe, N, leads to the burners.

The operation of our apparatus is as follows: The oil-tank A being filled with gasoline or other similar fluid, the latter flows through the feed-pipe B, filling the open space P at the bottom of the tank, and, rising through the tubular bolts F F, fills the upper space, Q, to the level of the vent-pipe. By this arrangement an automatic feed is obtained and the fluid in the evaporating-tank is maintained at a con-

stant level. As the flanges E E′ make a close joint with the walls of the tank, and as both the flanges E E′ and the disks *o o* make a close joint with the edges of the evaporator G, the fluid is prevented from entering the annular space J and the central air-space, K, but is permitted to reach the evaporating-surface of the coil C by penetrating the exposed edges thereof and permeating the capillary material of which it is composed. The air-current, entering through the pipe M and distributer L, circulates freely through the passages of the coil C, and, taking up in the form of vapor the liquid supplied to the surface of the latter through the pores of the material, passes out through the exit-pipe N. We thus obtain a dry carbureter, since the air-current can only come in contact with the fluid which is exposed upon the evaporating-surface, and the danger of freezing or of driving the liquid in the exit-pipes is obviated.

It is obvious that various modifications may be made in the disposition of the continuous sheet of capillary material—as, for instance, instead of being wound in a spiral coil, it might be folded in closely-approximating zigzags, or wrapped around a prismatic core instead of a cylindrical one. While, therefore, we prefer the latter as the most convenient and compact of the different arrangements, we do not desire to limit our claim to the spiral form embodied in the drawings, provided a practically continuous sheet of capillary material be so disposed as to leave a practically uniform and continuous air-passage between closely-approximating surfaces.

It is obvious that the end strips, H H, may be made of metal or other pliable material instead of the wood veneering, and we therefore do not desire to limit our claim to the method shown for preventing contact between the closely-approximating coils and isolating the air-current from direct contact with the body of the liquid. Nor is it essential that both edges of the capillary material should be immersed in the liquid, though we deem that method best adapted for thorough saturation of the air-current. We therefore do not limit ourselves to the precise form of the evaporating-tank and the arrangement of the evaporating-coil therein shown in the drawings.

We are aware that it is not new to construct evaporators of closely-approximated sheets of canton-flannel or similar limp material, stretched by fastening them at both ends or attached to a supporting-surface of sheet metal. Our method of construction differs from this in that the wood veneering which we use has sufficient rigidity to require no stretching or backing, but will support its own weight, thereby avoiding the necessity of supporting it by fastenings which occupy room without affording any increase of evaporating-surface, and we are thus enabled to obtain a very large surface of capillary material in a most compact form, permeable throughout by the liquid.

We are also aware that wood in the form of sawdust or of masses of shavings has been used for the evaporators; but in this form the peculiar advantages due to its rigidity are lost, and, moreover, the air-passages being necessarily irregular, the current seeks those which are freest, and hence where there is least liquid, and thus is not brought into contact with the entire evaporating-surface.

In our evaporator the arrangement of the veneering in closely-approximating and uniform sheets or folds, with regular and uniform in-passages throughout, compels the contact of the current with every portion of the evaporating-surface, and thus not only disposes the latter in a compact form, but also occasions a uniform and thorough saturation of the air.

It is also obvious that to obtain the second feature of our improvements—namely, a dry carbureter having an isolated air-passage—it is not absolutely essential that the capillary material used should be wood veneering, although we deem that best adapted for the purpose, and it may therefore be constructed of sheets of any pliable capillary material, having the edges of the air-passage closed from direct contact with the liquid by strips either of capillary or non-capillary material.

We are aware that it is not new to construct carbureters of a scroll coil of fibrous absorbent material maintained in position by strips of heavy metal at each end, and having the liquid-reservoir in direct communication with the interior of the spiral air-passage, such a device being described in the Letters Patent to H. J. Ferguson, dated March 2, 1875, No. 160,410. Our improvement differs from this method of construction in the fact that we protect the air-current from direct contact with the body of liquid from which the evaporating-surface is fed by isolating the air-passages, and thus obtain a dry carbureter, while in the other spiral evaporators referred to the liquid was freely admitted into the spiral air-passage, and was liable to be blown into the pipes or congealed by the cold produced from too rapid evaporation.

We are also aware that it is not new to supply the liquid to the evaporating-sheets by means of siphons or lamp-wicks attached to the top of each sheet and communicating with an adjacent oil-reservoir, while at the same time the bottom of the sheets was immersed in liquid. We do not desire to claim this method of construction, since in our improved evaporator we immerse both the upper and lower edges of the sheet directly in the liquid and at the same time maintain the air-passage in complete isolation therefrom.

We claim—

1. In an apparatus for producing illuminating-gas by the volatilization of a liquid, an evaporator consisting of a sheet or sheets of wood veneering uniformly disposed in closely-approximating surfaces.

2. In an apparatus for producing illuminat-

ing-gas by the volatilization of a liquid, an evaporator constructed of closely-approximating coils of capillary material having the spaces between their edges closed by strips, in combination with an exterior reservoir for the liquid, whereby the outer edges alone of the evaporating-coils are immersed in the liquid and an isolated air-passage is formed between the coils.

3. The combination of the pipes F with the flanges E E′, fitting closely to the sides of the tank D, the disks *o o*, and the intermediate closed evaporator, whereby communicating reservoirs are provided for the immersion of the edges of the capillary material.

4. The combination of the tank A, the communicating reservoirs P and Q, and the vent-pipe O, whereby the level of the liquid is automatically maintained in the evaporating-tank.

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