(No Model.)

C. FIESSE.

APPARATUS FOR OXYGENATING AND CARBURETING AIR.

No. 433,336. Patented July 29, 1890.

FIG. 1.

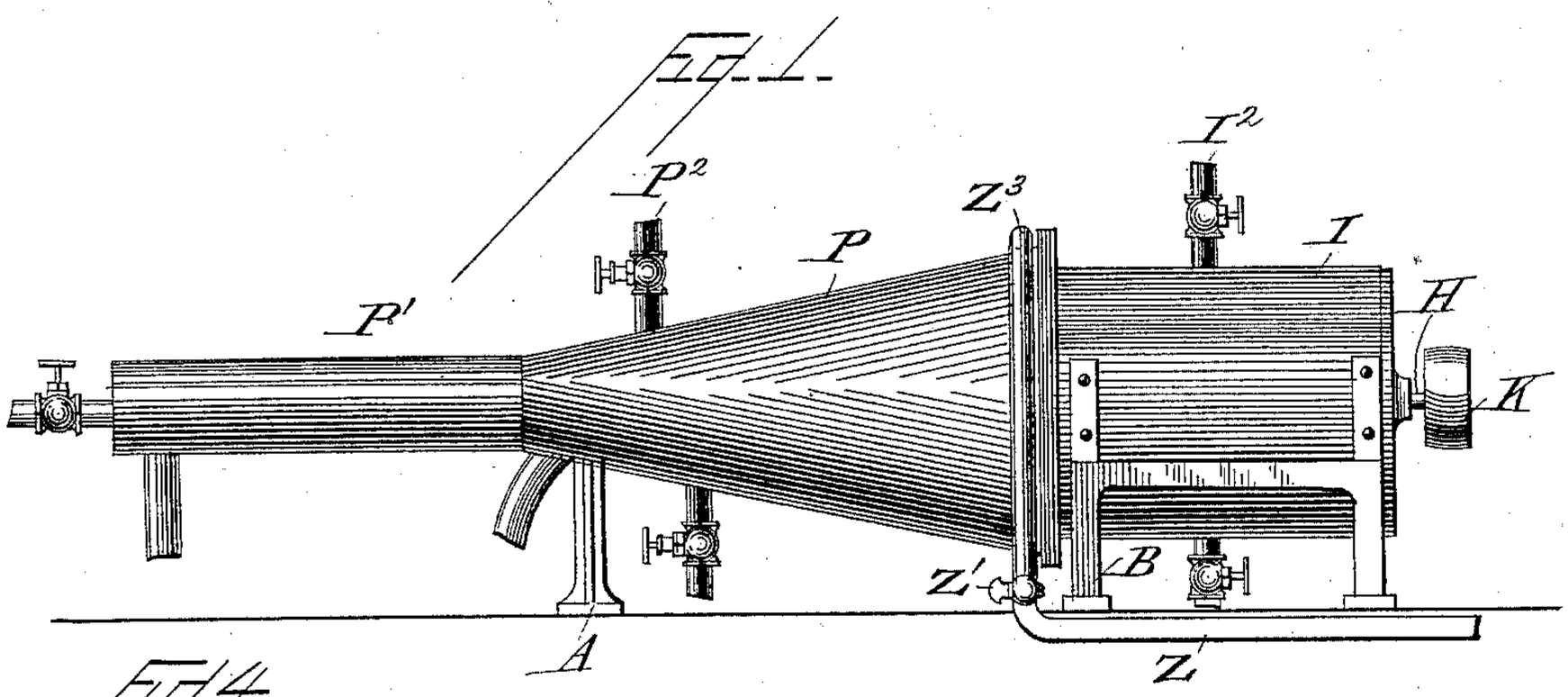

FIG. 4.

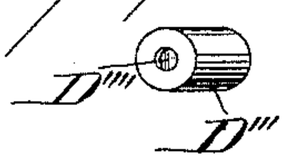

FIG. 2.

FIG. 3.

Attest:

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APPARATUS FOR OXYGENATING AND CARBURETING AIR.

SPECIFICATION forming part of Letters Patent No. 433,336, dated July 29, 1890.

Application filed November 7, 1889. Serial No. 329,499. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FIESSE, a citizen of France, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Apparatus for Oxygenating and Carbureting Air; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the improved form of gas producer and separator hereinafter to be described and claimed.

In the drawings, Figure 1 is a side view of my apparatus. Fig. 2 is a vertical longitudinal section; and Fig. 3 is a detail view of one of the nozzles in the preferred form. Fig. 4 is a detail.

In the drawings, like reference-letters refer to like parts throughout.

The prime object of my invention is to produce a fuel-gas which shall be composed of hydrogen and carbonic oxide, the carbonic oxide formed by the mixture of the carbon extracted from crude petroleum-oil or other hydrocarburet with the oxygen extracted from atmospheric air, said mixture taking place when the vapor of oil and air is in a state of partial dissociation by reason of high temperature and the special action of the porous partitions of certain construction to which the elements above mentioned are subjected. This action last mentioned is what is known in the sciences as "endosmose." The hydrogen, which also forms a part of the petroleum vapor, remains in the composite gas, produced as a separate combustible element, adding greatly to its calorific power. The object of my invention is to produce a fixed gas, and not a simple vapor, which will be again condensed when subjected to lower temperature.

A and B are suitable standards upon which my apparatus rests.

G is a hollow cylinder, which has at one end a conical nozzle D and at the other end a suitable head G′, which has openings J. Flannel cloth or other material suitable for removing impurities or moisture from the air is stretched across these openings J. Within the cylinder G is mounted another cylinder of lesser diameter F, which revolves in suitable bearings M M′. In the preferred form of my apparatus this cylinder F terminates in cones E E′ at either end. Upon the cylinder F is mounted the helical thread L, and upon the rear cone are mounted the triangular blades V, which are slightly inclined from right to left, as viewed from the rear of the machine.

From the small end of the conical nozzle D a passage-way O extends, and is controlled by means of the valve O′. Beyond this valve extends the pipe O^2. A second conical nozzle D′, of larger diameter than the first, surrounds said first nozzle, thereby forming a chamber in which said first nozzle is contained. D′ also has a discharge-outlet controlled by the valve D^2.

The entire apparatus—both the cylinder G and the chamber or nozzle D′—is surrounded by a suitable jacket I P P′. Into the space within this jacket the hot gases from a hot-blast stove, at a temperature of from 800° Fahrenheit up, may be introduced through the pipes I′ B^2, controlled by the valves I^2 P^3. The steam or gases are drawn off from said jacket through the discharge-outlets I^3 P^4, controlled by the valves I^4 P^5.

R is a tank containing petroleum or other hydrocarbon oil. Floating on the oil is a wooden float S, which is preferably surrounded by some metallic covering, such as zinc. This tank R has an opening R^2, through which it may be filled, said opening being closed by a screw-cap in the usual way, and also a discharge-pipe T controlled by the valve T′. The pipe O^2 also enters into the tank through the top at the point R′, as shown in Fig. 2. Leading from the lower portion of the tank R is the pipe Q^3, which enters said tank through the opening R^4. This pipe Q^3 is controlled by a valve Q^2 and empties into the prolongation of the second nozzle D′ by the opening Q, which is covered by any suitable spraying or atomizing device Q′.

The nozzle D has a number of openings, as shown in Fig. 3, which are covered by thin porous diaphragms W, of carbon from gas-retorts or any other of the well-known substances through which endosmose takes place most efficiently.

The blower is operated by means of the pulley K mounted on the shaft H.

Surrounding the base of the conical portion P of the jacket is the pipe Z^3, which is connected at various points with the interior of the second chamber D′ by means of the short pipes Z^2, as shown in Fig. 2. Leading from this pipe Z^3 is a discharge-pipe Z controlled by the valve Z′.

The operation of my invention is as follows: First, when it is used to generate a gas for lighting and heating, the jacket is filled with highly-superheated gas, the valves O′ and T′ are partly opened, the valve Q^2 is opened and D^2 closed. Upon the rotation of the cylinder F air is then drawn in through the openings J, and a considerable portion thereof is forced through the porous diaphragms W. According to the well-known chemical law of endosmosis, the mixture of gases which is thus passed through said diaphragms has a much higher percentage of oxygen than before it was passed through said diaphragms. The result, therefore, in the second chamber D′ is a highly-heated mixture of oxygen and nitrogen, in which the percentage of oxygen is higher than in ordinary air. That portion of the air which does not pass through the diaphragms passes on through the partly-opened valve O′ into the tank R, and from thence out through the passage-way T. The float S protects the oil from contact with the hot air. The regulation of the valve T′ determines the back-pressure upon the float S in the tank, and said pressure forces the oil, by the pipe Q^3, through the atomizer Q′, so that the oil enters the chamber D′ in a semi-vaporous condition, and its vaporization is there instantly completed by the heat of the surrounding jacket. Said oil-vapor passes along the chamber D′ until it meets the streams of oxygeneated air coming out through the diaphragms W. The mixture before referred to is then produced, and if a sufficient degree of heat is obtained from the jacket the excess of oxygen in the issuing mixture of gas combines with the oil-vapor to form carbonic oxide through the partial dissociation consequent upon the heat of the surrounding jacket. The mixture of gases, composed largely of carbonic oxide and hydrogen, passes out through the pipes Z^2, and finally issues through the discharge-pipe Z, ready for storage or to be sent forward where it is needed.

Second, when it is designed to use the apparatus simply as a separator, the valve T′ is opened wide and the valve Q^2 shut, while the valve D^2 is opened. Suitable connections being then made with the pipes T and the extension of D′ upon the rotation of the blower, the former pipe will yield a mixture of gases in which the percentage of nitrogen has been raised, while the latter will yield one in which the percentage of oxygen has been increased. The passage of either of these streams through succeeding machines of similar construction will increase the percentage of oxygen or decrease it to any desired extent.

While I have illustrated a specific form of blower to be used and conical nozzles and chambers with surrounding jackets for the purpose of superheating, it is evident that any form of blower could be used, any shape of chamber employed, and one of a number of well-known methods of superheating applied without departing from the spirit of my invention.

I am of course aware that the temperature at which complete dissociation of gases and vapors takes place is so high that it would be impossible to attain it with the apparatus herein described, inasmuch as to effect such a dissociation the gases would have to be passed through a retort or muffle of some highly-refractory substance; but the high temperature obtainable by highly-heated gases passing through the jacket, as in the apparatus described by me, would be sufficient to produce a partial dissociation, or at least to accelerate the combination of the constituents of the gases, and thereby to form a fixed gas out of what was before largely a vapor. I also wish it distinctly understood that while I have specifically mentioned and claimed carbon from gas-retorts as the substance out of which diaphragms through which endosmose is to occur are made, I do not limit my invention to the use of such substance. Carbon from gas-retorts is mentioned as the preferred material; but all other substances through which this action takes place I regard as equivalents thereof and as included within the scope of my invention.

When the machine is employed for the first purpose—that of manufacturing a fuel-gas—the valve D^2 may be unscrewed and the cap D‴, (shown in Fig. 4,) having the peep-hole D⁗, in which isinglass is set, is put on so that the operator can look into the retort D′. Moreover, on the removal of the cap or the valve, a scraper may be inserted for the purpose of removing impurities accumulated in the retort.

I am aware that heretofore it has been proposed to produce highly-oxygenated air by drawing the atmosphere into a receptacle through a porous partition by suction; but the advantage of my invention lies in the fact that by the use of the blower and the two chambers both the mixture with the increased per cent. of oxygen and that containing the increased per cent. of nitrogen are preserved and under control, so that they may be delivered wherever desired.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination of a blower, a chamber with which that blower is connected, an outlet from said chamber controlled by a valve, and openings in the side of said chamber covered by thin porous diaphragms of carbon,

together with a second chamber whose walls surround the first and which is also provided with an outlet controlled by a valve from gas-retorts, substantially as described.

2. The combination of a blower, a chamber with which that blower is connected, an outlet from said chamber controlled by a valve, and openings in the side of said chamber covered by thin porous diaphragms of carbon from gas-retorts, together with a second chamber in which the gases which pass through the diaphragms may collect, apparatus for superheating said chamber, and a spraying apparatus through which atomized petroleum may be mixed with the contents of said chamber, substantially as described.

3. The combination of a blower, a chamber with which that blower is connected, an outlet from said chamber controlled by a valve, and openings in the side of said chamber covered by thin porous diaphragms of carbon from gas-retorts, together with a second chamber in which the gases which pass through the diaphragms may collect, a surrounding jacket for superheating, a closed oil-tank, a connection whereby the pressure existing in the first-named chamber may be applied to the surface of the oil in said tank, and a pipe which leads from said tank to the second-named chamber and terminates in a spray-nozzle, by which heated oil-vapor may be mingled with the heated gases in said chamber, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHAS. FIESSE.

Witnesses:
JOSEPH B. PAYEZ,
JOHN J. WARD.