No. 885,905. PATENTED APR. 28, 1908.

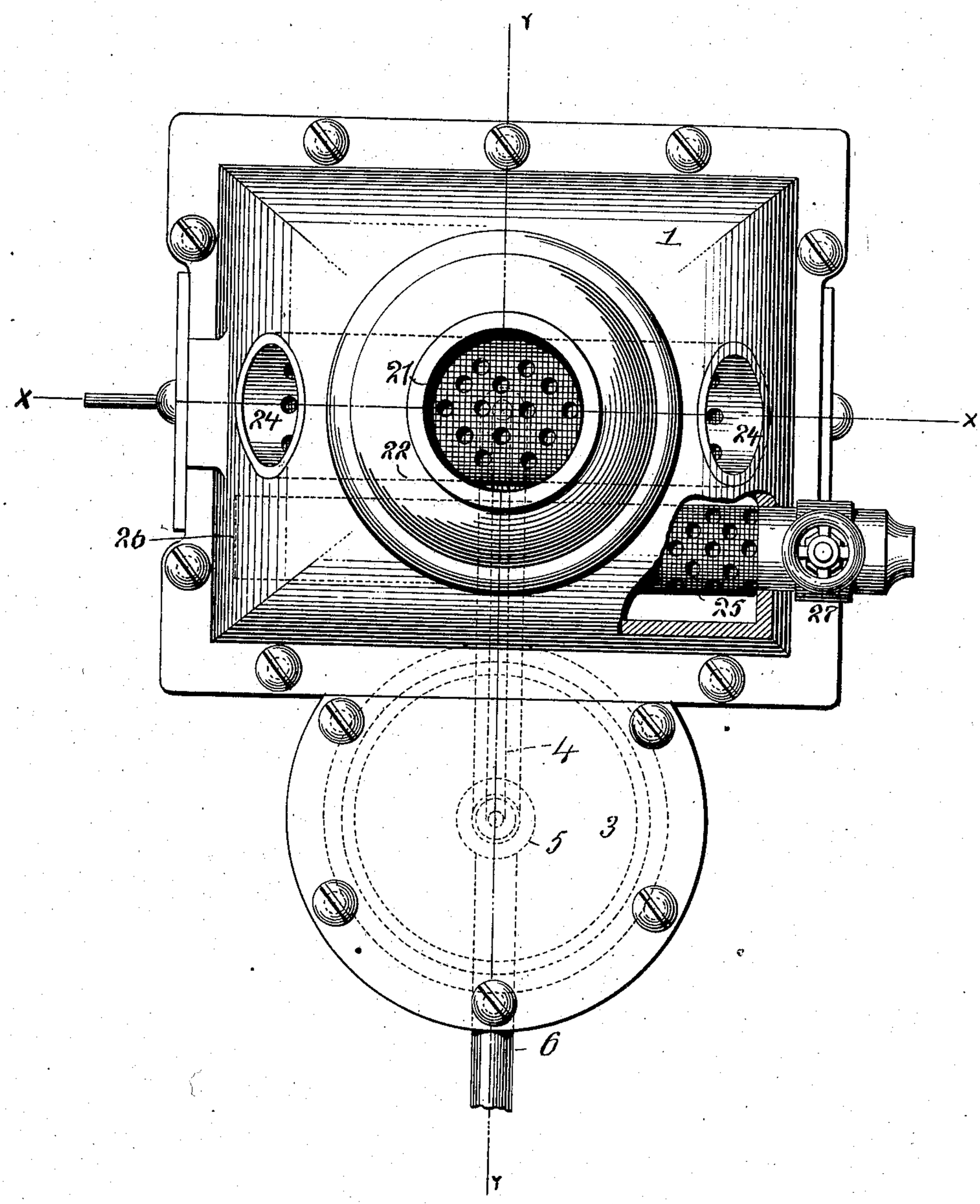
S. G. AVERELL.

CARBURETER.

APPLICATION FILED APR. 28, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Gustave Dieterich.

Edwin N. Dieterich.

INVENTOR

Sylvester G. Averell

BY Parker Lyon

his ATTORNEY

No. 885,905. PATENTED APR. 28, 1908.

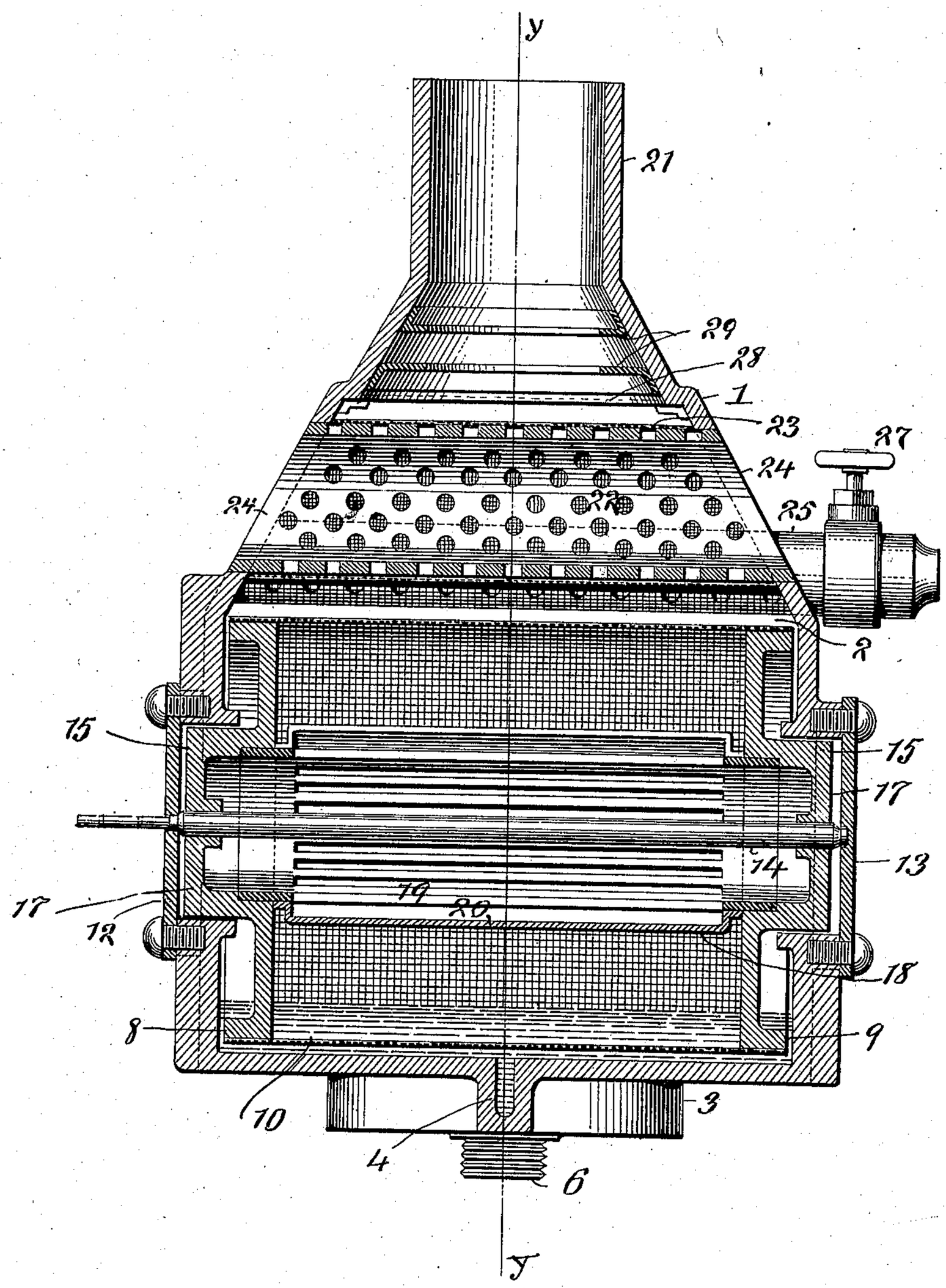
S. G. AVERELL.

CARBURETER.

APPLICATION FILED APR. 28, 1906.

3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

Gustave Witterich.

Park Benjamin Jr.

INVENTOR

Sylvester G. Averell

BY Park Benjamin

his ATTORNEY

No. 885,905. PATENTED APR. 28, 1908.

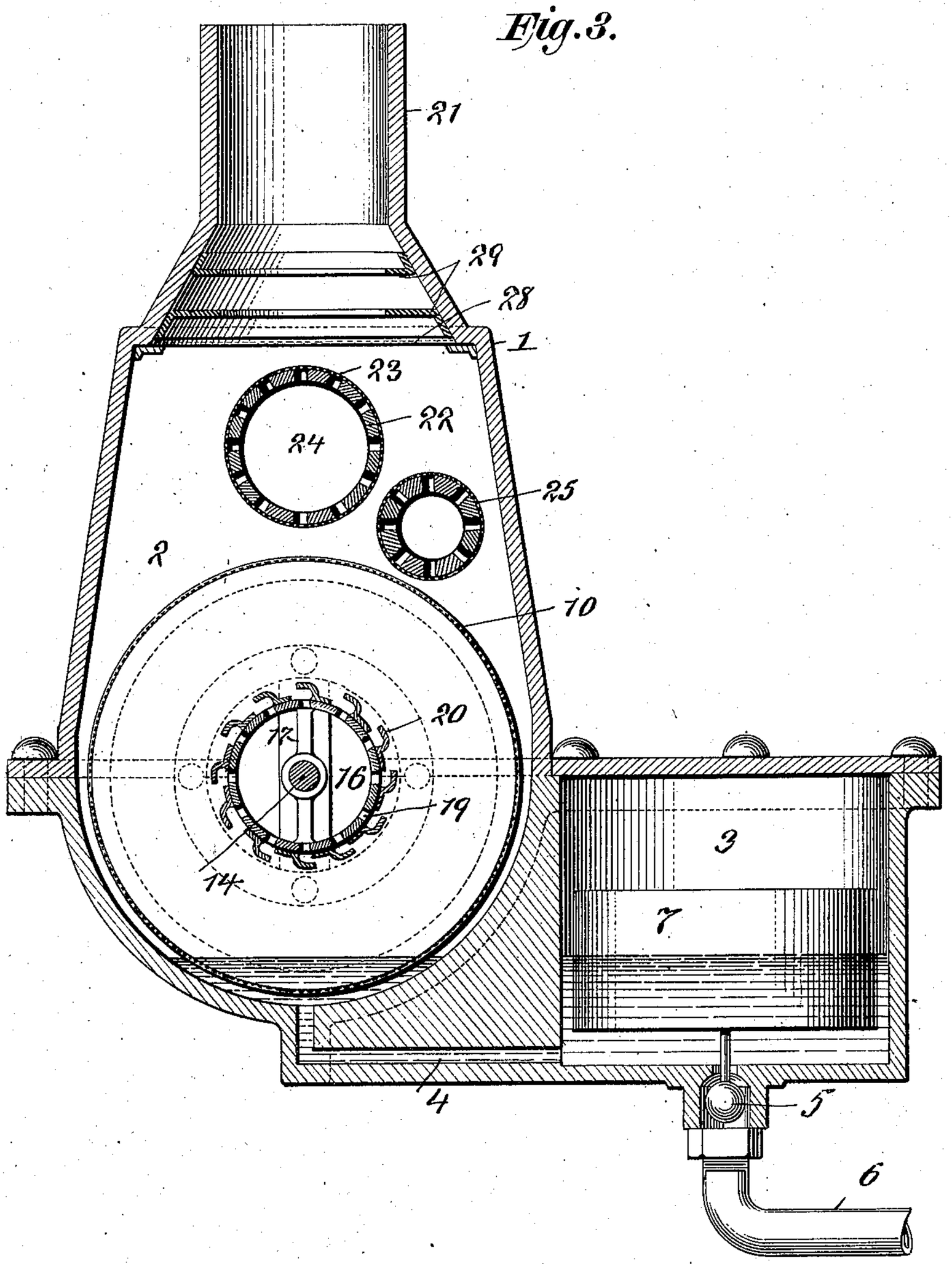
S. G. AVERELL.

CARBURETER.

APPLICATION FILED APR. 28, 1906.

3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES:

Gustave Dieterich.

Edwin W. Dieterich.

INVENTOR

Sylvester G. Averell

BY Lauri Benjamin

his ATTORNEY

UNITED STATES PATENT OFFICE.

SYLVESTER G. AVERELL, OF NEW YORK, N. Y.

CARBURETER.

No. 885,905. Specification of Letters Patent. Patented April 28, 1908.

Application filed April 28, 1906. Serial No. 314,133.

To all whom it may concern:

Be it known that I, SYLVESTER G. AVERELL, citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Carbureters, of which the following is a specification.

The invention relates to carbureters for charging air with hydro-carbon to produce an inflammable mixture.

The principle of the invention is as follows; to draw air through films of liquid hydrocarbon formed in the whole unimmersed area of a cylindrical capillary screen which is caused to rotate while partly immersed in said hydrocarbon; and by the construction of the device to impart to said air during its passage through said screen, a low velocity. By reason of the exposure of the maximum film area of the screen to the action of the air and of the low velocity of the air current, said air becomes charged only with hydrocarbon vapor and not with hydrocarbon liquid; and therefore the known disadvantages incident to the use of air more or less charged with hydrocarbon liquid as an explosive mixture in gas engines are avoided.

In the accompanying drawings—Figure 1 is a plan view. Fig. 2 is a vertical section on the line *x x* of Fig. 1, and Fig. 3 is a vertical section on the line *y y* of Figs. 1 and 2.

Similar numbers of reference indicate like parts.

1 is the casing, having a main chamber 2 in which is the carbureting vessel and also an auxiliary chamber 3 which communicates by the conduit 4 with the chamber 2. In the bottom of auxiliary chamber 3 is seated a ball valve 5, which regulates the flow of liquid hydro-carbon or other volatilizable liquid into said chamber from the supply pipe 6. The stem of valve 5 is connected to a float 7, which rises with the liquid level in said chamber and so closes valve 5 when said liquid has reached a predetermined level in both chambers 1 and 2. The quantity of liquid hydro-carbon in chamber 1 is thus regulated and kept uniform.

Particular attention is called to the following; first, that the immersed area of the wire gauze cylinder is small as compared with the unimmersed area (see Fig. 3) and, in fact, the area of immersion should be no greater than will efficiently produce the liquid films in the capillary screen formed by the cylinder wall; second, that the air escaping into the cylinder and casing enters an enlarged space wherein its velocity becomes greatly reduced; nor can this velocity be rendered great by the ordinary suction of a gas engine at the duct 21 as hereinbefore set forth. The whole unimmersed area of the wire gauze is completely unobstructed by any extraneous devices, and necessarily so, since the free passage of the air to all the liquid films produced in the interstices is very important. Equally the low air velocity is important since this insures a taking up of the thin films in the form of vapor, and not in the form of liquid.

8 and 9 are flanged disks supporting the foraminated (wire gauze) cylinder 10. Journaled at its ends in the bars 12, 13 which extend across openings in the casing wall, is the disk supporting shaft 14. The disks 8, 9 have cylindrical projections 15 open at their outer ends, as shown at 16. Across these openings extend the transverse bars 17 in which the shaft 14 is secured. Entering the projections 15 and coaxial with shaft 14 is a tube 18 having longitudinal slots 19 in its wall. On the outside of the tube and extending over said slots are buckets 20.

The casing 1 preferably diminishes in area upward to the outlet duct 21. Extending across said casing is a tube 22 having a foraminated wall covered with wire gauze 23 and open preferably at both ends 24 to the atmosphere. Parallel to tube 22 extends a smaller tube 25 preferably closed at its end 26 and extending through the wall of the casing outside of which it has a valve 27. Tube 25 is also foraminated and covered with wire gauze. Across the casing and above the tubes 22 and 25 extends a wire gauze partition 28 and above this are baffle plates 29.

The operation of the device is as follows: A regulated quantity of liquid hydrocarbon or other volatilizable liquid being admitted to the chamber 2 from chamber 3, suction is caused at the outlet duct 21 by a gas engine or by any other suitable means. Air is then drawn into the tube 18 through the openings 16 in disks 8, 9, and escapes through the slots 19 in said tube, striking the concavities of the buckets 20 and so setting said tube and hence the disks 8, 9 and wire gauze cylinder 10 in rotation upon shaft 14 as an axis. The cylinder 10 in thus rotating enters the liquid hydrocarbon and takes up the same in the

interstices of the wire gauze, and the air being drawn through these interstices in turn takes up the liquid and becomes charged therewith; the cylinder thus forming a capillary screen. Meanwhile the same suction causes air to enter at both ends of tube 22 and pass through the openings in said tube and wire gauze covering thereof. This air, not charged with hydrocarbon, mingles with the already charged air to dilute the same. The final mixture passes through the wire gauze partition 28 to the escape outlet 21 and so to the engine or to wherever else it is to be utilized.

I desire now to call particular attention to the fact that with a given suction the amount of air which enters the wire gauze cylinder and there becomes charged with hydrocarbon depends upon the combined areas of the openings 16 in disks 8 and 9. Also that with the same suction the amount of air which enters the tube 22 depends upon the cross sectional area of said tube, doubled because the tube is open at both ends. Hence by proportioning the cross sectional area of tube 22 and the area of openings 16, I am enabled to control the relative proportions of charged and uncharged air and thus produce a mixture of definite proportions, irrespective of variations in the pressure or quantity of air entering the apparatus. Or, in other words, this is a carbureter in which the relative proportions of charged air and uncharged air does not depend upon and is not controlled by variations in suction or air pressure; but on the contrary are maintained the same through initial proportioning of the air inlets in the manner described.

The object of the tube 25 having the valve 27, is to slightly vary the relative proportions of charged air and uncharged air in order to compensate for external pressure differences such as barometric variations. To this end, the valve 27 which is kept normally closed is opened to whatever extent may be necessary.

While I prefer to rotate the cylinder 10 by the air escaping from the slots 19 acting on the buckets 20, this construction is not essential inasmuch as I may cause the rotation of cylinder shaft 14 by any suitable means.

I claim:—

1. In a carbureter, a casing for containing liquid hydrocarbon, a hollow rotary capillary screen receiving in its interior the air to be carbureted, partly immersed in said hydrocarbon and having the interstitial area of its unimmersed portion mechanically unobstructed, an air inlet to the interior of said screen and an escape duct receiving carbureted air from the whole unimmersed periphery of said screen; the combined area of the interstitial openings in the said unimmersed portion of the screen being greater than that of said air inlet whereby the velocity of the air passing through said screen is decreased.

2. In a carbureter, a casing for containing liquid hydrocarbon, a rotary cylindrical capillary screen partly immersed in said hydrocarbon, and having an air inlet in its end for admitting air directly to its interior and a duct having an enlarged inlet and constructed directly to receive from said screen the air flow passing through the whole interstitial area of the unimmersed portion thereof; the combined area of the interstitial openings in the said unimmersed portion of the screen being greater than that of said air inlet whereby the velocity of the air passing through said screen is decreased.

3. In a carbureter, a casing for containing liquid hydrocarbon, a rotary shaft therein, heads on said shaft having air inlet openings, a cylindrical capillary screen carried by said heads and partly immersed in said hydrocarbon, and a duct constructed to receive directly from said screen the air flow passing through the whole interstitial area of the unimmersed portion thereof.

4. In a carbureter, a casing for containing liquid hydro-carbon, a rotary vessel having a foraminated circumferential wall entering said liquid and an open foraminated tube seated at its extremities in opposite walls of said casing and disposed above said vessel and between said vessel and an outlet in said casing.

5. In a carbureter, a casing for containing liquid hydro-carbon, a rotary vessel having a foraminated circumferential wall entering said liquid, an open foraminated tube seated at its extremities in opposite walls of said casing, a second foraminated tube extending into said casing and closed at its inner end, and a valve in said tube controllable outside of said casing.

6. In a carbureter of the type in which air to be carbureted is caused to traverse the device by suction from a gas engine or the like, a casing for containing liquid hydrocarbon, a rotary capillary screen receiving said air in its interior, partly immersed in said carbon and having the interstitial area of its unimmersed portion mechanically unobstructed and means actuated by said air for rotating said screen.

7. In a carbureter of the type in which air to be carbureted is caused to traverse the device by suction from a gas engine or the like, a casing for containing liquid hydrocarbon, a rotary capillary screen receiving said air in its interior, partly immersed in said carbon and having the interstitial area of its unimmersed portion mechanically unobstructed and means disposed in the space surrounded by said screen and actuated by said air for rotating said screen.

8. In a carbureter of the type in which air

to be carbureted is caused to traverse the device by suction from a gas engine or the like, a casing for containing liquid hydro-carbon, a rotary capillary screen receiving said air in its interior, partly immersed in said carbon and having the interstitial area of its unimmersed portion mechanically unobstructed and an air receiving cylinder supported within said screen having openings in its wall and buckets on the outer surface of said wall in proximity to said openings.

9. In a carbureter, a casing for containing liquid hydro-carbon, a hollow rotary capillary screen receiving in its interior the air to be carbureted, partly immersed in said hydro-carbon and having the interstitial area of its unimmersed portion mechanically unobstructed, an escape duct receiving carbureted air from the whole unimmersed periphery of said screen and means actuated by the incoming air for rotating said screen.

10. In a carbureter, a casing for containing liquid hydro-carbon, a shaft journaled in said casing, heads supported on said shaft and having air openings, a capillary screen on said heads having air openings in its wall and disposed within said screen and supported on said heads and buckets on the outer surface of said screen in proximity to said openings.

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

SYLVESTER G. AVERELL.

Witnesses:

WM. H. SIEGMAN,

PARK BENJAMIN, Jr.