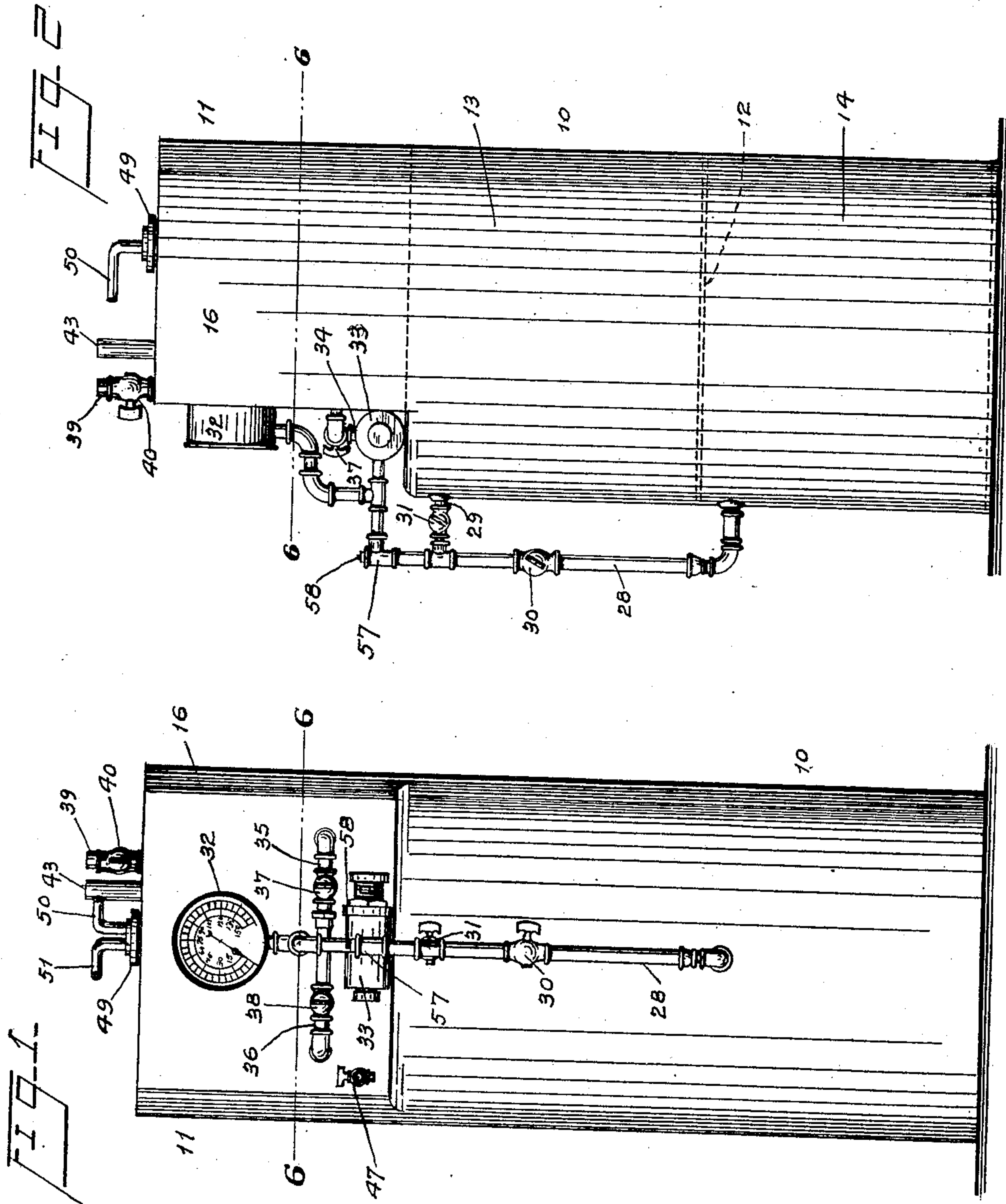


G. VON ACH.
 APPARATUS FOR ADMINISTERING GASES AND VAPORS.
 APPLICATION FILED JUNE 22, 1908.

925,442.

Patented June 22, 1909.

4 SHEETS—SHEET 1.



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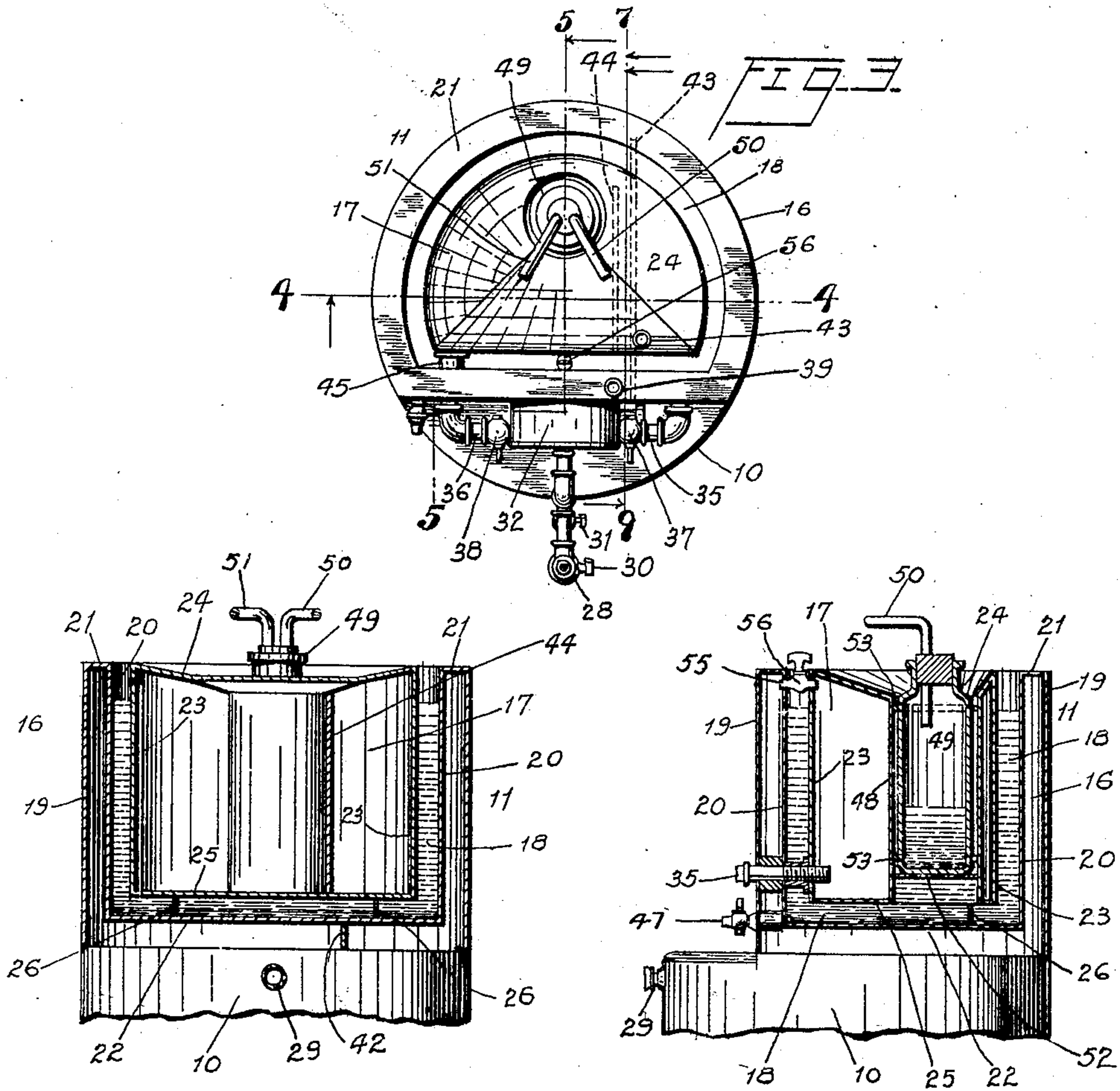


FIG. 4.

FIG. 5.

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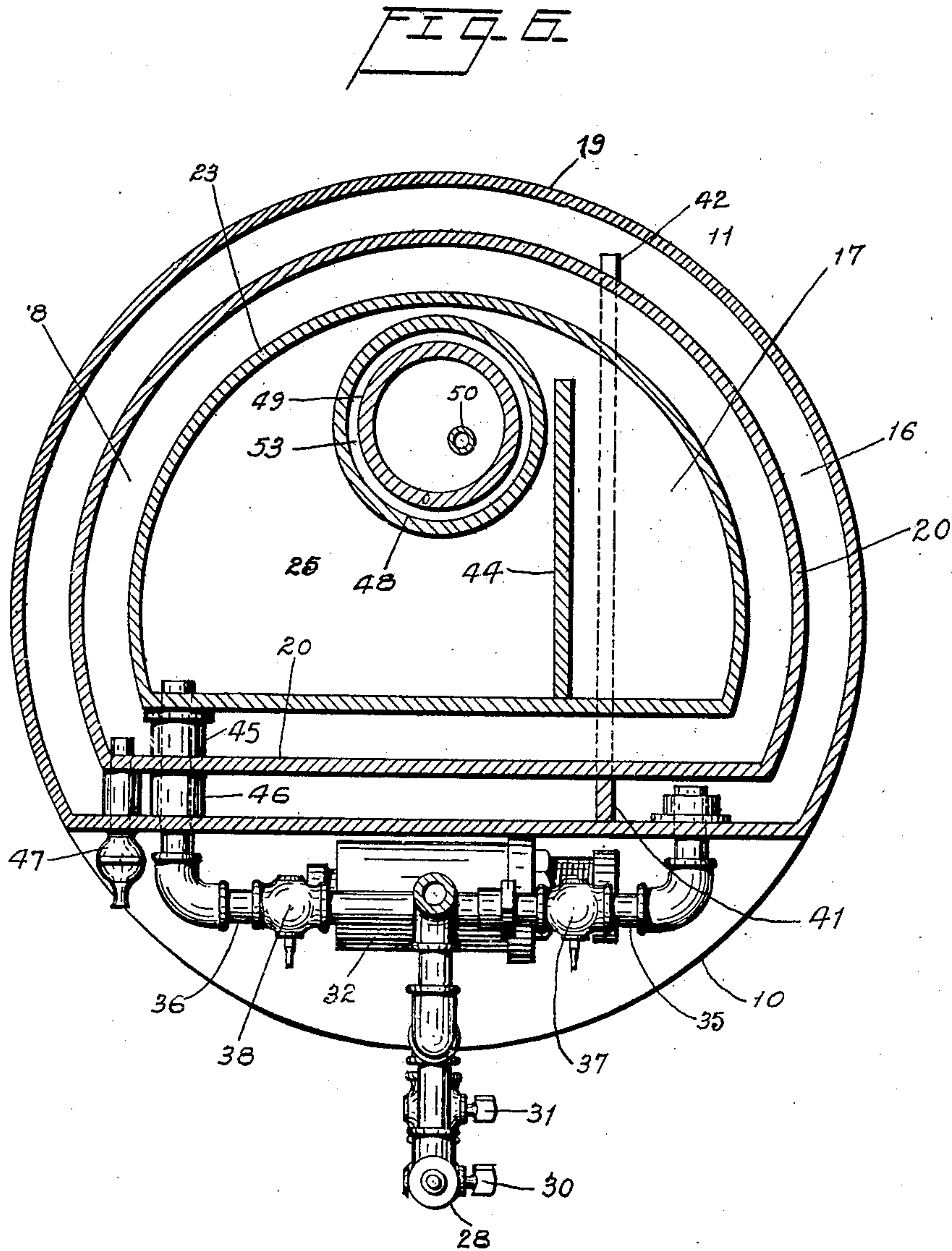
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4 SHEETS—SHEET 3.



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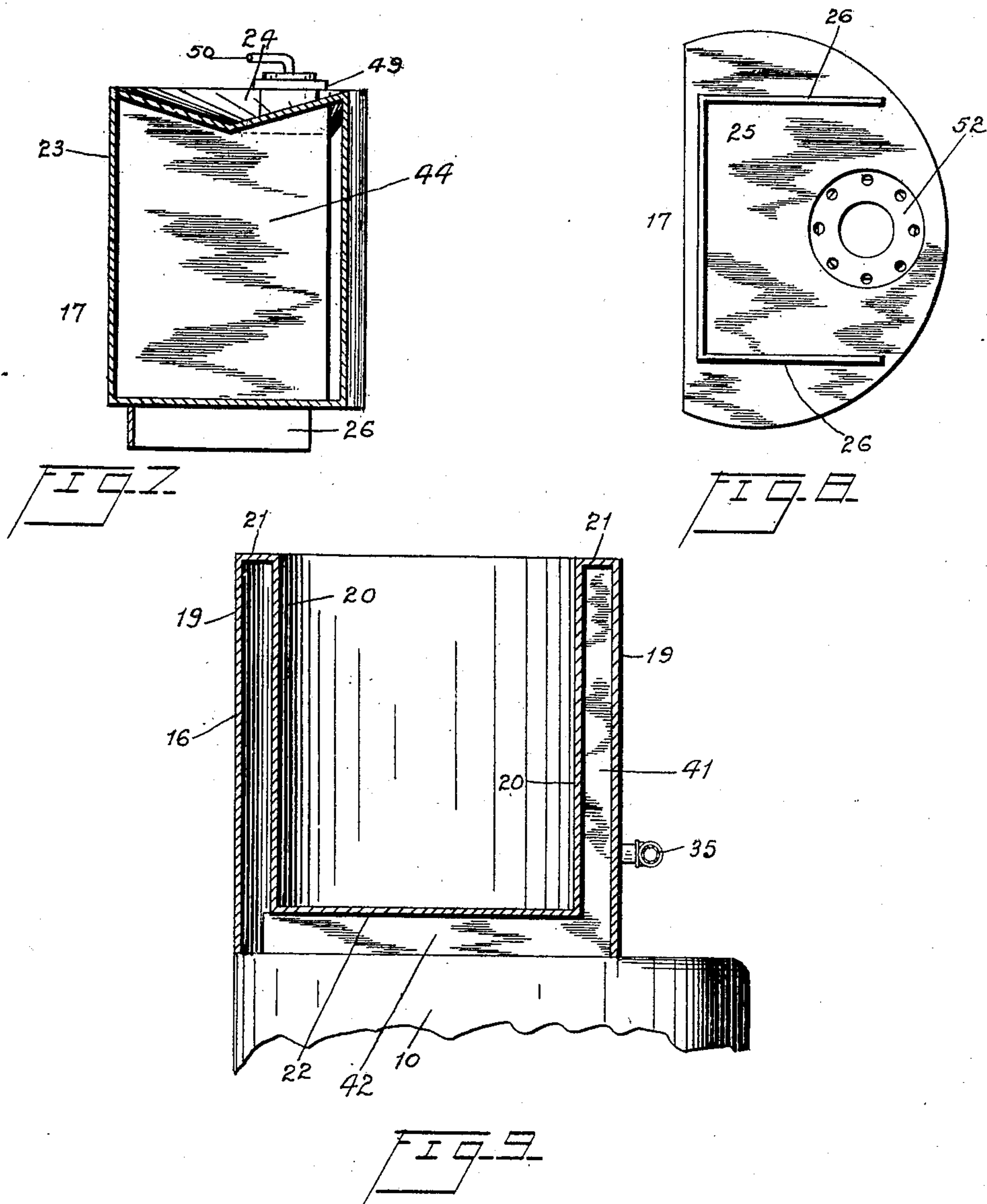
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ADMINISTERING GASES AND VAPORS.

No. 925,442.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed June 22, 1908. Serial No. 439,693.

To all whom it may concern:

Be it known that I, GEORGE VON ACH, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Apparatus for Administering Gases and Vapors, of which the following is a specification.

This invention relates to certain improvements in that class of apparatus for administering gases by inhalation which is represented by the device shown in my prior patent No. 890,484, issued June 9, 1908, and the objects of the present invention are to provide means whereby two vapors or gases are contained in and handled by the same apparatus; to enable said gases or vapors to be administered either separately and independently, or separately and successively, or to be mixed and administered; to provide a construction by which a second gas is always conveniently accessible while using another; to enable the gases and vapors to be administered in a cold dry or cold moist, hot dry or hot moist condition; to secure a suitable containing cylinder; to provide a simple and easily operated construction; to thus enable physicians, nurses and others to administer gases or vapors with facility and effectiveness, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts in the several figures, Figure 1 is a front elevation of an apparatus of my improved construction for administering gases and vapors, Fig. 2 is a side view of the same, and Fig. 3 is a plan; Fig. 4 is a central vertical section taken on line 4—4, Fig. 3, looking in the direction indicated by the arrow, of those parts of my improved apparatus above the gas containing portion of the cylinder, and Fig. 5 is a similar section taken on line 5—5, Fig. 3, looking in the direction indicated by the arrow, and at right angles to the section in Fig. 4; Fig. 6 is a transverse sectional view taken on line 6—6, Figs. 1 and 2; Fig. 7 is a section of a certain inner reservoir taken on line 7—9, Fig. 3, looking in the direction indicated by the double arrow, and Fig. 8 is a bottom view of the said inner reservoir; Fig. 9 is a section of a certain outer reservoir taken on line 7—9, Fig. 3, looking in the direction indicated by the single arrow.

In said drawings, 10 indicates the body portion or gas-containing part of my improved apparatus in its preferred form, and 11 the upper devices for administering the gases. The said body portion 10 is constructed of sheet metal, as is common in manufacturing gas cylinders, and its interior chamber is divided as by a partition 12 into separate compartments 13 and 14 adapted to contain different gases or vapors, as will be hereinafter described. At the top of the body part 10, its walls are carried upward or extended to form and support the said administering devices 11. The said gas administering devices comprise an outer reservoir 16 and an inner reservoir 17, both being of an air-tight construction for the purpose of temporarily storing and heating the gases for use. The inner reservoir 17 is of approximately cylindrical shape, while the outer reservoir is annular in form to inclose the said inner reservoir, the two reservoirs providing between themselves an annular water jacket 18 which will be hereinafter more fully described. The said outer reservoir 16 is preferably constructed by extending the walls of the cylinder or body portion 10, as stated, to form the outer wall 19 of the said outer reservoir, and an inner wall 20 is provided at a distance therefrom to allow the desired space between. This inner wall 20 is connected at its top edge to the upper edge of the outer wall 19, as at 21, and which connection both supports the said inner wall and closes the top of the outer reservoir 16. The said inner wall 20 terminates at its lower edge short of the top of the body portion 10, and a horizontal partition 22 is joined to said edges thus extending the said outer reservoir over the entire top of the body portion 10, as shown in Figs. 4 and 5 more especially. The inner reservoir 17 has upright side walls 23, a top 24 and a bottom 25, and stands upon the partition 22 of the outer reservoir, being suitably spaced therefrom by a foot 26. At the sides of this inner reservoir, ample room is left between it and the inner walls of the outer reservoir to form the water jacket 18. The water in this jacket therefore is in contact with the inner walls and partition 22 of the outer reservoir, and also with the outer walls and bottom of the inner reservoir. At the front of the apparatus, the said reservoirs 16 and 17 are flattened or cut away from the true circle of the gas cyl-

inder or body portion 10 below, as clearly shown in the drawings, and thus space is afforded for certain pipe connections which will next be described. From the lower
 5 compartment 14 of the gas cylinder a pipe 28 leads upward to the top of the cylinder or body portion 10, and below said top another pipe 29 leads from the upper compartment 13 into the said first mentioned pipe
 10 28. Both the said pipe 29 and the pipe 28, at points between their union and their respective compartments, are provided with valves 30 and 31 respectively.

As the invention is described further, it
 15 will be apparent that the two valved pipes 28 and 29 leading from the two compartments of the cylinder enable two different kinds of gas or vapor to be placed at the immediate control of the operator. For in-
 20 stance, one compartment of the cylinder may contain nitrous monoxid and the other oxygen, and thus if at any time it was found that too much of the nitrous monoxid had been administered, oxygen could at once be
 25 given. Or again, one compartment of the cylinder might contain oxygen and the other pure air which could be used to dilute the oxygen as should be found necessary in administering it. By these illustrations it will
 30 be seen that the beneficial feature of my invention consists in having what amounts to a plurality of tanks adapted to contain different gases, always in actual connection with the administering devices. This en-
 35 ables a change to be made from one gas to another as desirable or necessary, without the loss of valuable time, or maybe fatal delay, in substituting one apparatus for another or even disconnecting and connecting
 40 again. A pressure gage 32 is in connection with the said pipe 28, and beyond said gage the pipe 28 leads to a pressure regulator 33, which may be of any common and well-known construction adapted to properly re-
 45 duce the pressure from the cylinder 10. From the said pressure regulator 33 the gas passes upward through a pipe 34 into the two arms 35, 36 of a transverse horizontally disposed pipe, each of said arms being
 50 valved as at 37 and 38 respectively. One of the said pipe arms, as 35, opens through the flattened front wall of the outer reservoir 16 into the chamber of the same, as shown in Fig. 6 most clearly. This pipe opens into
 55 the reservoir near its bottom, as shown in Figs. 1 and 2, and at the top of the reservoir is an outlet pipe 39, provided with a valve 40 and to which a flexible administering tube as shown in my prior patent above referred
 60 to, can be attached as desired. In order to prevent gas entering through the inlet pipe 35 from passing directly to the discharge 39, a baffle plate or partition 41 is arranged in the said outer reservoir 16, as shown most
 65 clearly in Fig. 9. This partition 41 extends

vertically from top to bottom of the reservoir between the inlet and outlet pipes, 35 and 39 above described, and also extends horizontally across the bottom part of the reservoir as at 42. Gas entering through
 70 the inlet 35 is thus compelled to circulate through or around the entire reservoir before escaping. The other arm 36 of the horizontally disposed pipe in front of the
 75 reservoir extends entirely through the outer reservoir and water jacket, as shown in Fig. 6, and opens into the inner reservoir 17, preferably near its bottom as described in
 connecton with the other pipe arm and
 80 outer reservoir. The inner reservoir also has at its top an outlet 43, which is adapted to receive the tube leading to a mouth-piece, when desired, the said tube and mouth-
 piece being of any ordinary form and fully
 85 illustrated in my said prior patent. A vertical baffle plate or partition 44 arranged in the said inner reservoir between the inlet
 pipe 36 and outlet 43 causes the gas entering
 said reservoir to circulate throughout the
 same before escaping. To secure a greater
 90 imperviousness where the inlet pipe 36 to the inner reservoir passes through the outer reservoir and water jacket, sleeves or bushings 45 and 46 inclose the said pipe and are
 95 soldered or otherwise imperviously connected at their ends to the adjacent walls.

It will be understood that by the construction of reservoirs above described, gas can be administered from the reservoirs either
 100 cold or heated as desired, since by filling the water jacket with hot water the temperature of the contents of the reservoirs can be raised. An outlet faucet 47 is provided at the bottom of the said water jacket.

Preferably an opening or chamber 48 is
 105 provided in the inner reservoir 17 extending from top to bottom thereof, and this opening is adapted to receive a bottle 49 through which the gas may be conducted from either
 110 reservoir when it is desired to have the same moist. This location of the bottle 49 is for convenience, and is substantially as shown in my prior patent above referred to. The
 bottle itself is the common water trap variety, with one tube 50 entering through its
 115 cork beneath the surface of the water in the bottle and the other tube 51 terminating in the upper part of the bottle. In use, therefore, the tube 50 is coupled to the outlet pipe
 (39 or 43) of the reservoir from which gas is
 120 being taken, and the flexible mouth-piece duct is attached to the other tube 51 of the wash bottle. The said bottle 49 preferably rests upon a perforated floor 52 in the said
 chamber 48, through which the contents of
 125 the water jacket may pass, and the top 24 of the inner reservoir is preferably sloped or inclined toward the chamber 48, so as to provide a sort of funnel for filling the water
 jacket. Rubber bands or washers 53 also
 130

preferably surround the wash bottle 49 to hold it central in its chamber.

Preferably a connecting pipe 55 extends between the inner and outer reservoirs at a suitable point and is provided with a valve 56, whereby the two reservoirs can be placed in communication if it should be desired to do so.

It will be noted that the water bottle chamber 48 is not located exactly central of the inner reservoir 17, but is placed near the back of the same, as clearly shown in Fig. 3, the purpose of this being to afford space between the ends of the bottle tubes and the front of the gas administering devices for the attachment of the flexible tubes described.

The pipe 28 which leads upward at the front of the gas cylinder or body portion 10 is provided at its top where it bends toward the pressure regulator, with a T-connection 57, as shown in Figs. 1 and 2, the top end of said connection having a removable plug 58. Connection can be made at this point therefore in filling the cylinder compartments, and by closing one of the valves leading to the two compartments and also closing the valves leading to the inner and outer reservoirs, the compartment to which the other valve leads may be charged. Then by closing that valve and opening the other, the other compartment can be charged, after which the plug 58 is screwed firmly in place. It should also be noted that the pressure gage 32 registers for each compartment of the cylinder 10 when it is placed in communication with the reservoir, and further registers for them when the compartments are being charged or filled as above described. Furthermore, the use of the pressure regulator 33 at the point indicated, enables the high pressure of the cylinder compartment to be reduced to a low pressure in the reservoirs, whereby the said reservoirs do not have to be constructed with thick heavy walls, but said walls may be light and thin, thus economizing space, weight and material.

Supposing the upper compartment 13 of the body portion 10 to contain oxygen, and the lower compartment 14 nitrous monoxid, the use of my improved apparatus is as follows. A flexible mouth piece tube having been connected to the discharge pipe 39 of the outer reservoir, if dry gas is desired, the valves 31 and 37 are opened, the valve 36 remaining closed. Oxygen will now pass into the outer reservoir 16 and its escape therefrom can be controlled by the valve 40. If a greater degree of heat is required, the said valve 40 is closed and the valve 56 between the two reservoirs opened, the mouth-piece tube in this case being removed from the discharge pipe 39 to the discharge pipe 43 of the inner reservoir. The oxygen now circulates entirely through both reservoirs before being led to the patient. Obviously, if moist gas

is desired, the water bottle 49 is introduced between the reservoir discharge pipe and the flexible mouth-piece tube.

In using nitrous monoxid from the lower compartment 14, the same procedure may be employed as above described, except that the valve 30 is opened instead of the valve 31. And furthermore, under some conditions it would be possible to first fill the outer reservoir with one kind of gas, and allow it to remain so while the other gas is being circulated and administered through the inner chamber. In this case both kinds of gas are very immediately accessible, as will be understood.

The water bottle tubes 50 and 51 are preferably made of metal and enameled on both inside and outside, so that they have all the desirable qualities of glass tubes and at the same time are not so fragile and liable to break.

Having thus described the invention, what I claim as new is:

1. The combination with a gas cylinder, of an administering device mounted upon said cylinder comprising outer and inner reservoirs with a water jacket between, means for conducting gas from the cylinder to either reservoir, and means for leading the gas from each reservoir.

2. The combination with a gas cylinder, of an administering device comprising an outer reservoir depressed or hollowed at its center, an inner reservoir within said central space of the outer reservoir and forming therewith a water jacket between the two reservoirs, means for conducting gas from the cylinder to either of said reservoirs, and means for leading it from said reservoirs.

3. The combination with a gas cylinder, of an administering device comprising an outer reservoir chambered centrally from its top, an inner reservoir within said chamber of the outer reservoir, said inner and outer reservoirs forming between themselves a water jacket and the inner reservoir being centrally chambered, a wash bottle in said chamber of the inner reservoir, means for conducting gas from the cylinder to either of said reservoirs, and means for leading it from said reservoirs.

4. The combination with a gas cylinder, of an administering device mounted upon said cylinder comprising outer and inner reservoirs with a water jacket between, a valved direct connection between said reservoirs, means for conducting gas from the cylinder directly to either reservoir, and means for discharging gas from either reservoir.

5. The combination of a gas cylinder having a plurality of compartments, an administering device on the top of said cylinder having outer and inner reservoirs with a water jacket between, said administering device being flattened at its front side on a chordal plane in plan view, a pipe at the front

of the upper part of the gas cylinder, means connecting the lower end of said pipe to each compartment of the cylinder, a pressure regulator on the top of said cylinder in the recess formed by flattening the administering device, said pipe leading to said regulator, a pressure gage above said regulator also in the said recess and being connected to the said pipe between said regulator and the cylinder connections below, a pipe leading from said regulator, valved branch pipes leading from said last mentioned pipe one to each of the said outer and inner reservoirs through the front flattened wall of the administering device, said last-mentioned pipe and branches being located in said recess, discharge means for each reservoir independent of the other, and a direct valved connection between said reservoirs.

6. The combination with a gas cylinder having a plurality of separate compartments, of an administering device mounted upon said cylinder and having a plurality of reservoirs, means for conducting gas from each compartment of the cylinder to a reservoir, means for connecting said reservoirs direct, and discharge means for said reservoirs.

7. The combination with a gas cylinder having a plurality of separate compartments, of outer and inner gas reservoirs with a water jacket between, means for conducting gas from each compartment of the cylinder to a reservoir, and discharge means for said reservoirs.

8. The combination with a gas cylinder

having a plurality of separate compartments, of an outer reservoir mounted upon the end of said cylinder and centrally chambered at its top, an inner reservoir in said chamber forming with the outer reservoir a water jacket, means for conducting gas from each compartment of the cylinder to a reservoir, and discharge means for said reservoirs.

9. The combination with a gas cylinder having a plurality of separate compartments, of an outer reservoir mounted upon said cylinder and centrally chambered at its top, an inner reservoir in said chamber forming with the outer reservoir a water jacket, and pipe connections leading from each compartment of the cylinder to a reservoir through its side walls.

10. The combination with a gas cylinder, of an administering device comprising an outer reservoir chambered centrally from its top, an inner reservoir within said chamber of the outer reservoir, said inner and outer reservoirs forming between themselves a water jacket and having each an inlet and an outlet adjacent to each other, a baffle plate in each reservoir between its inlet and outlet extending nearly across the chamber, means for connecting said reservoirs, means for conducting gas from the cylinder to either reservoir, and means for leading it from said reservoirs.

GEORGE VON ACH.

In the presence of—

BERTHA S. FULTON,
ETHEL B. REED.