

G. VON ACH.
 APPARATUS FOR HOLDING AND ADMINISTERING GASES.
 APPLICATION FILED DEC. 2, 1908.

923,752.

Patented June 1, 1909.

5 SHEETS—SHEET 1.

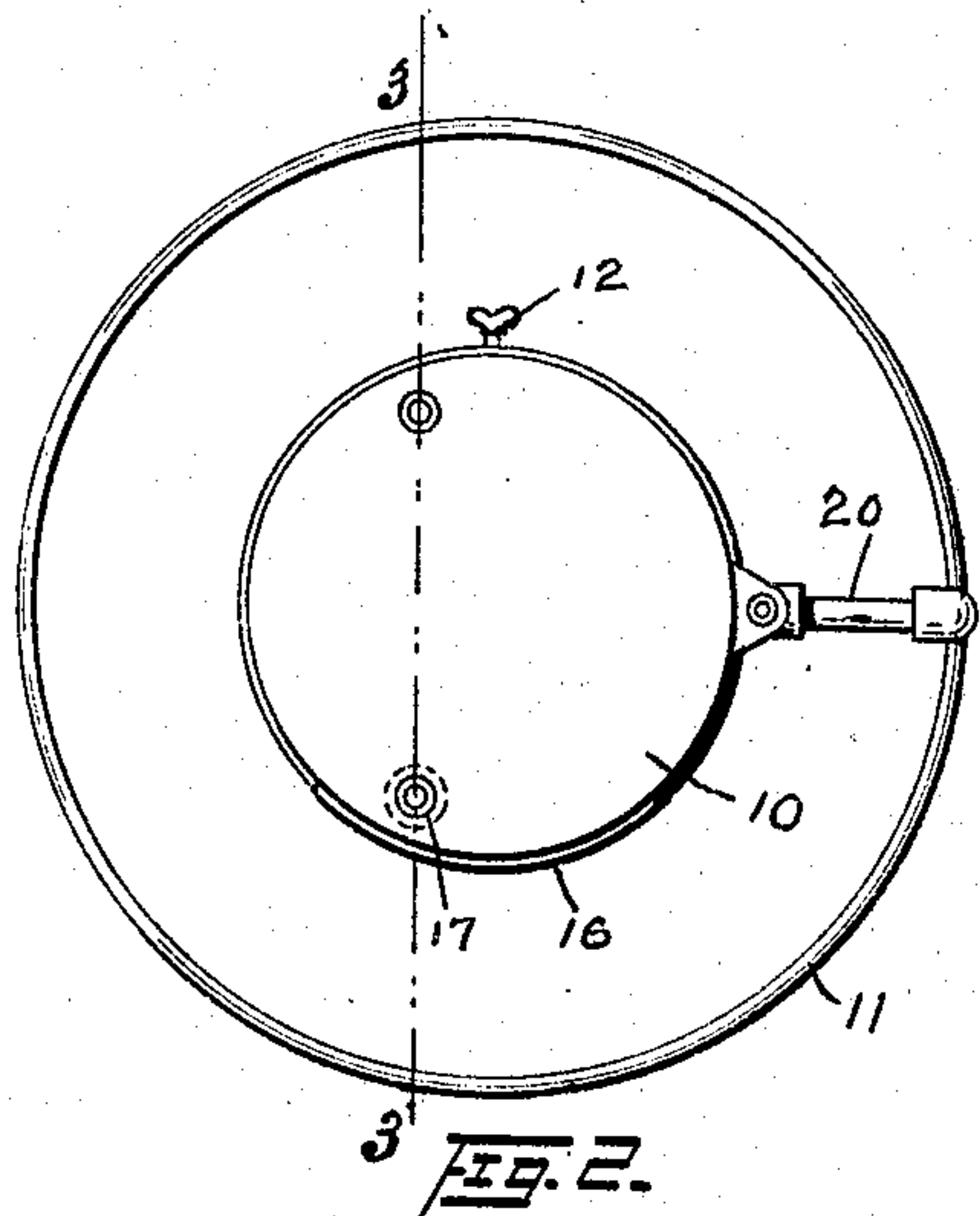


Fig. 2.

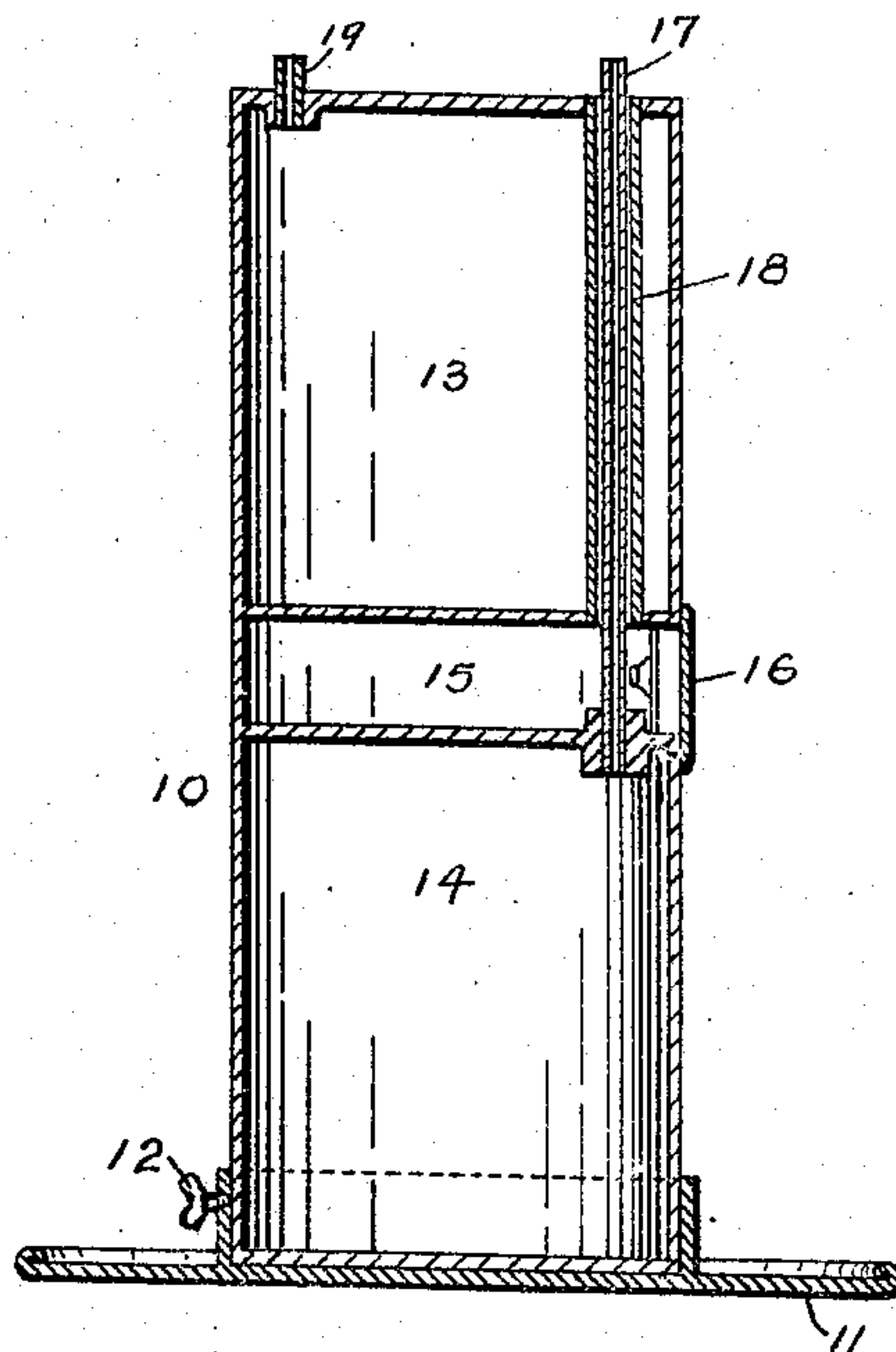


Fig. 3.

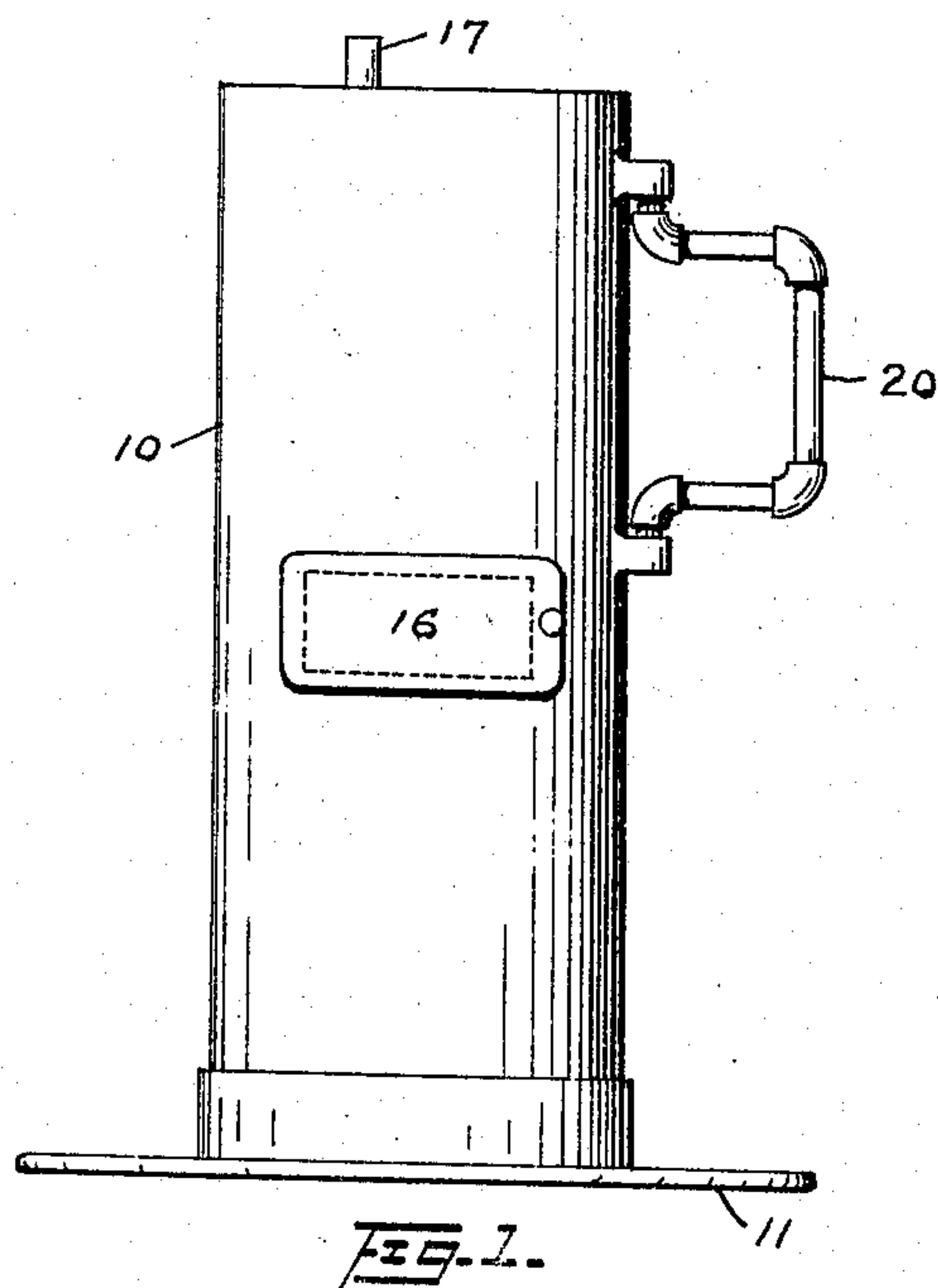


Fig. 1.

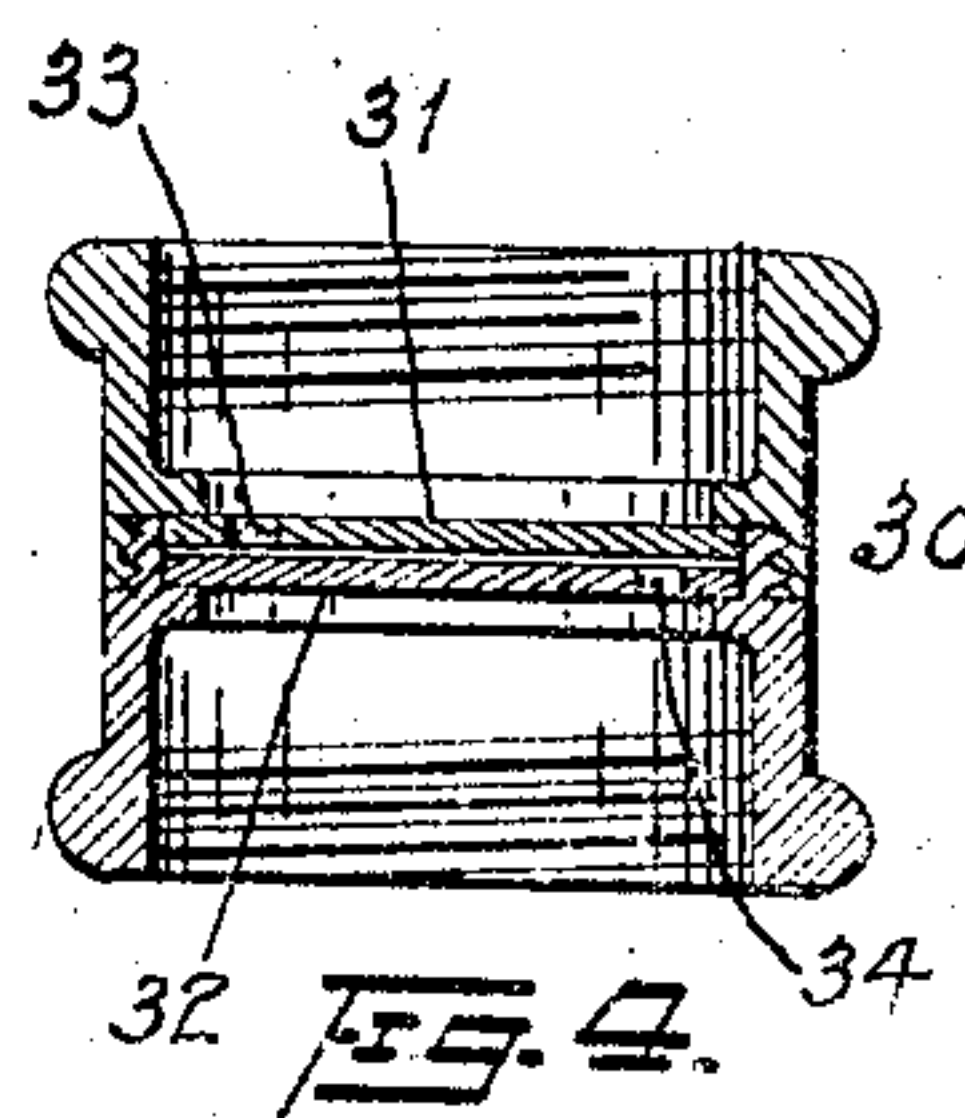


Fig. 4.

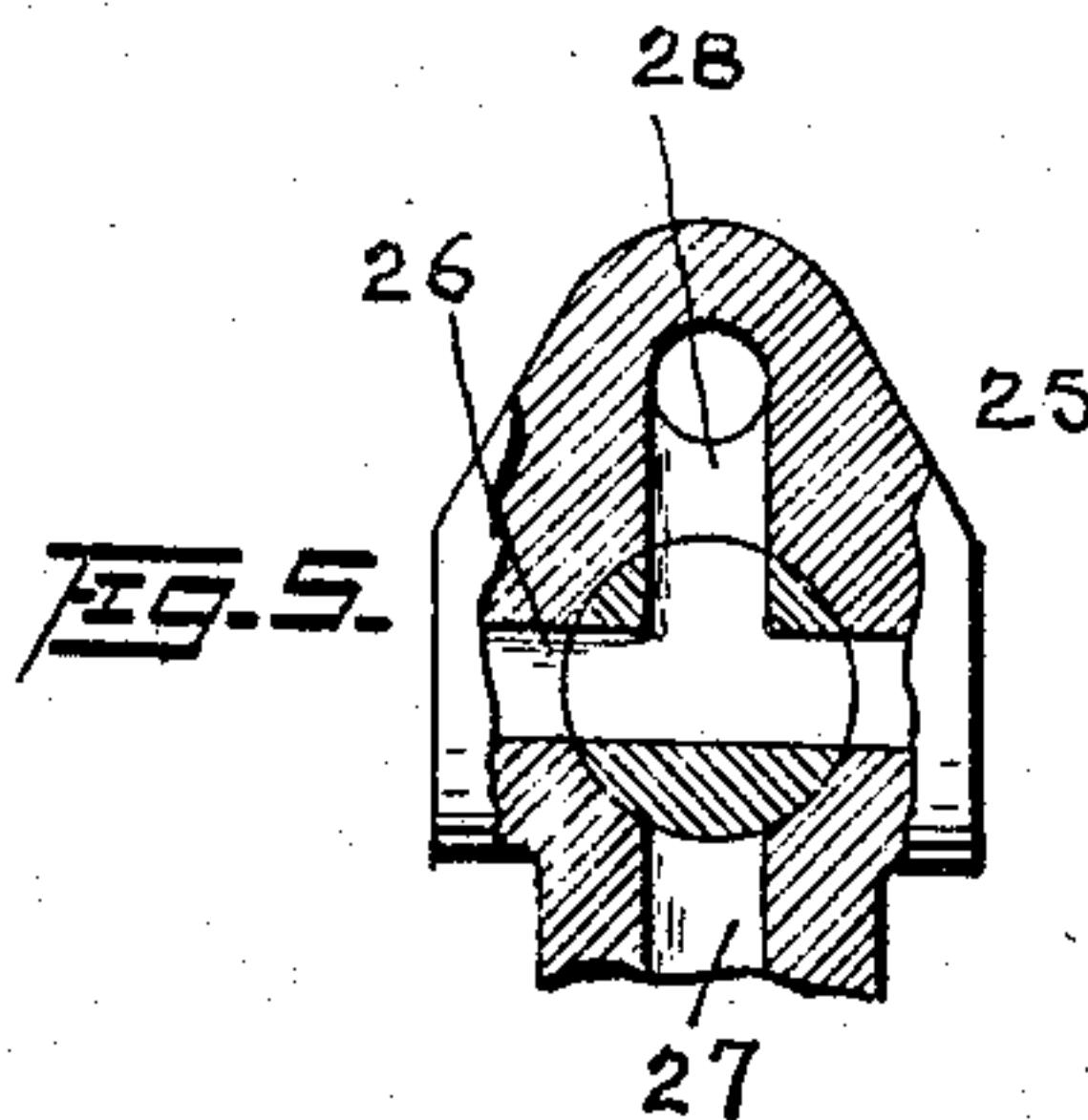


Fig. 5.

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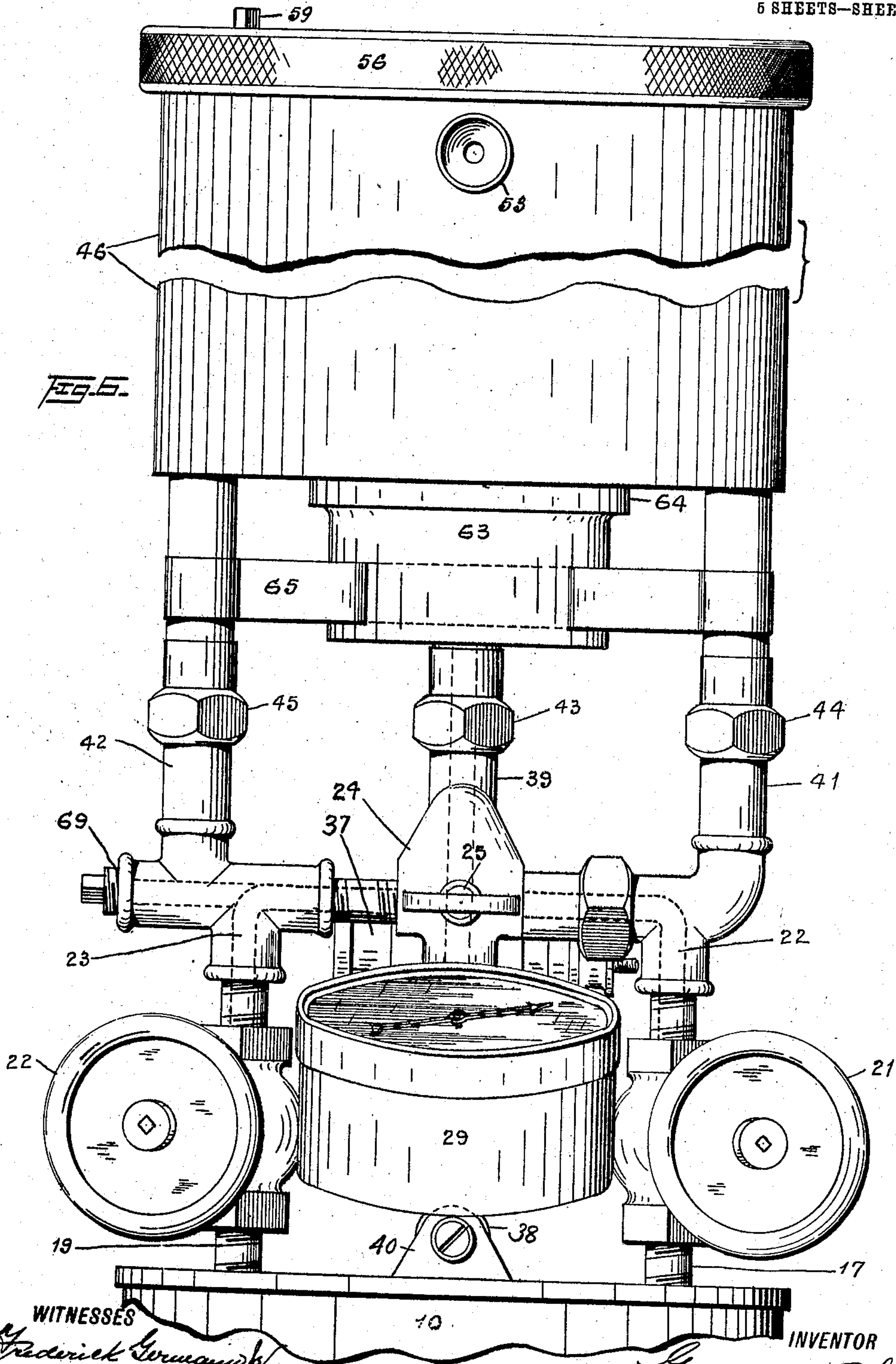
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5 SHEETS—SHEET 2.



WITNESSES
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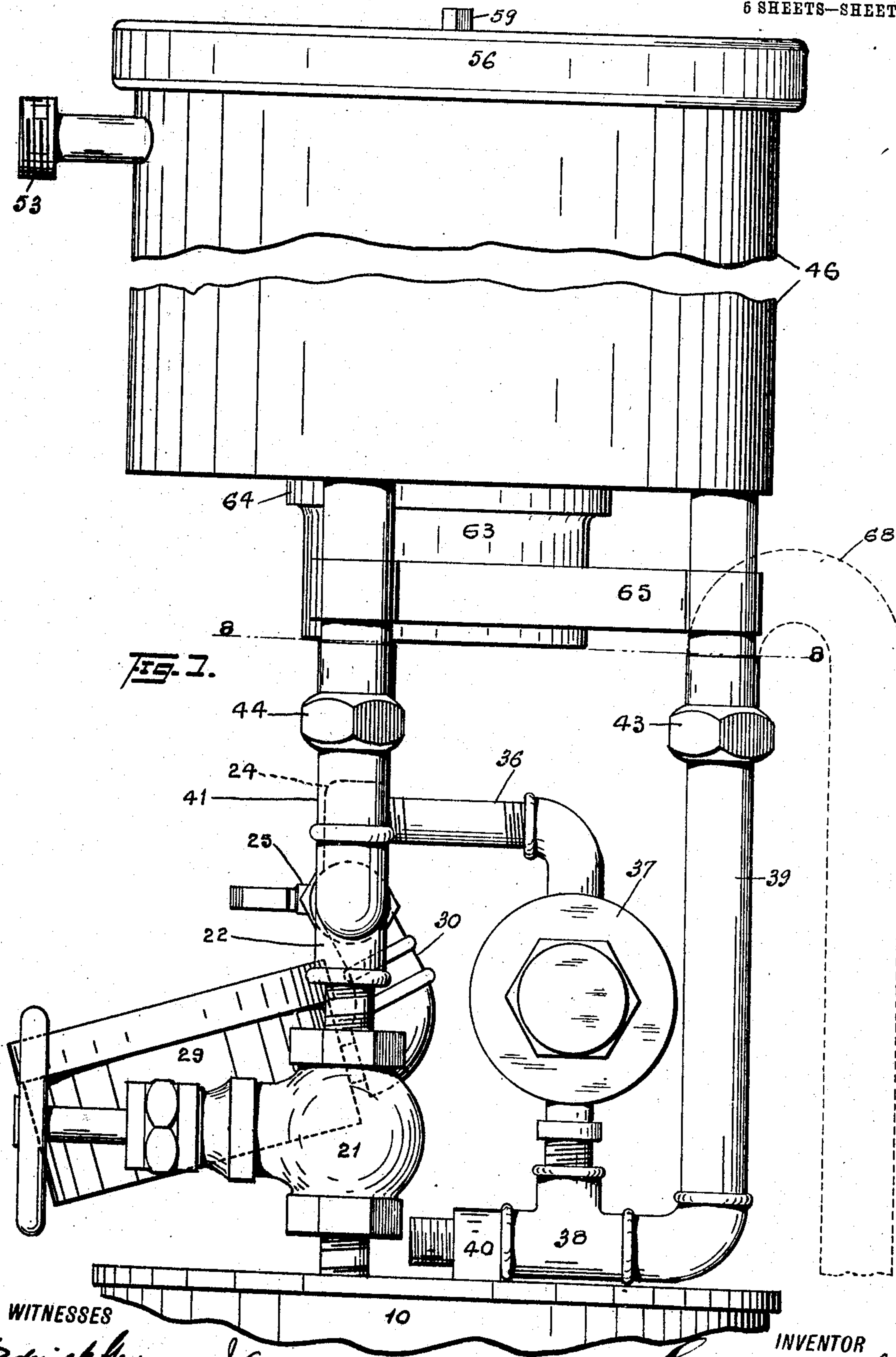
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6 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

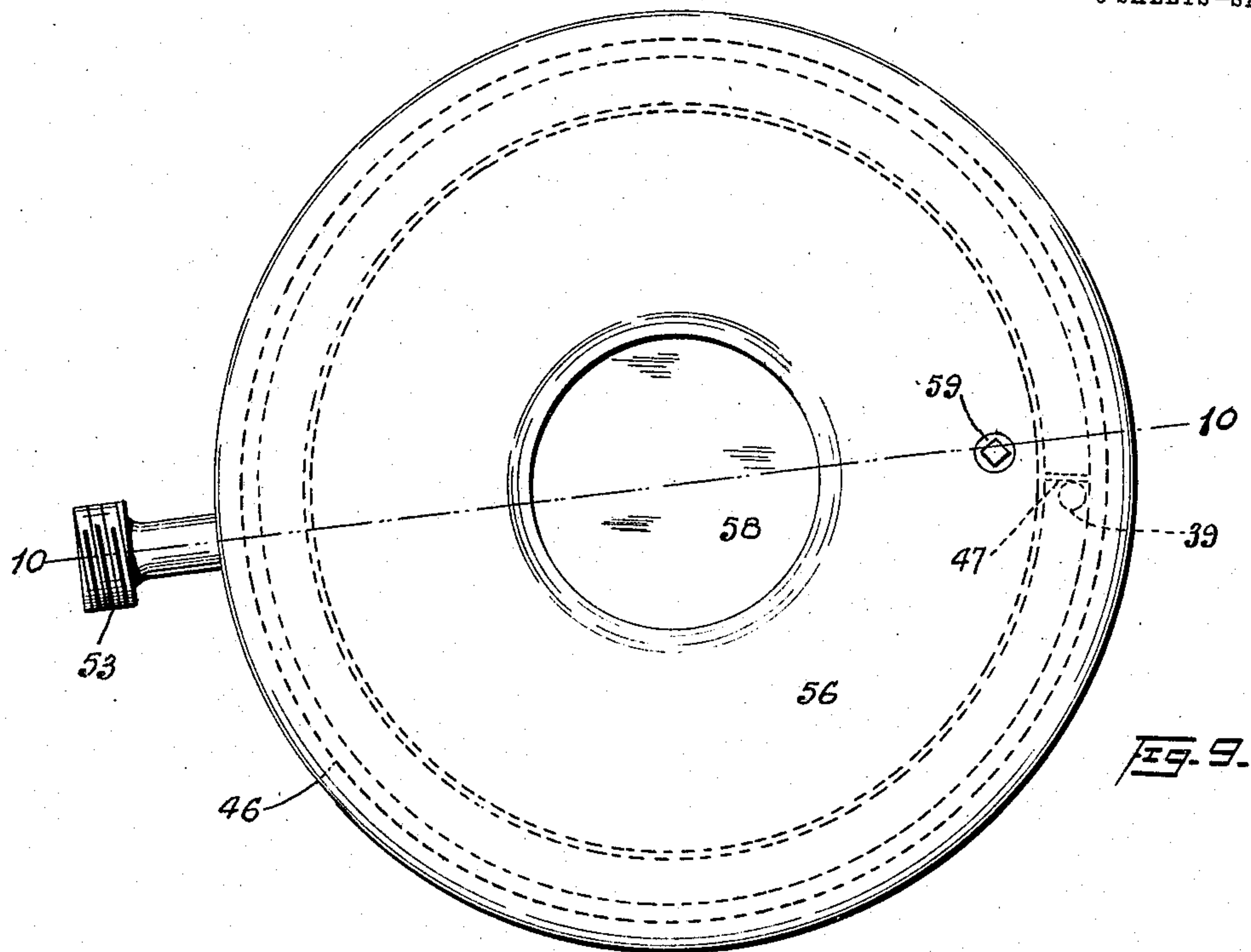


Fig. 9.

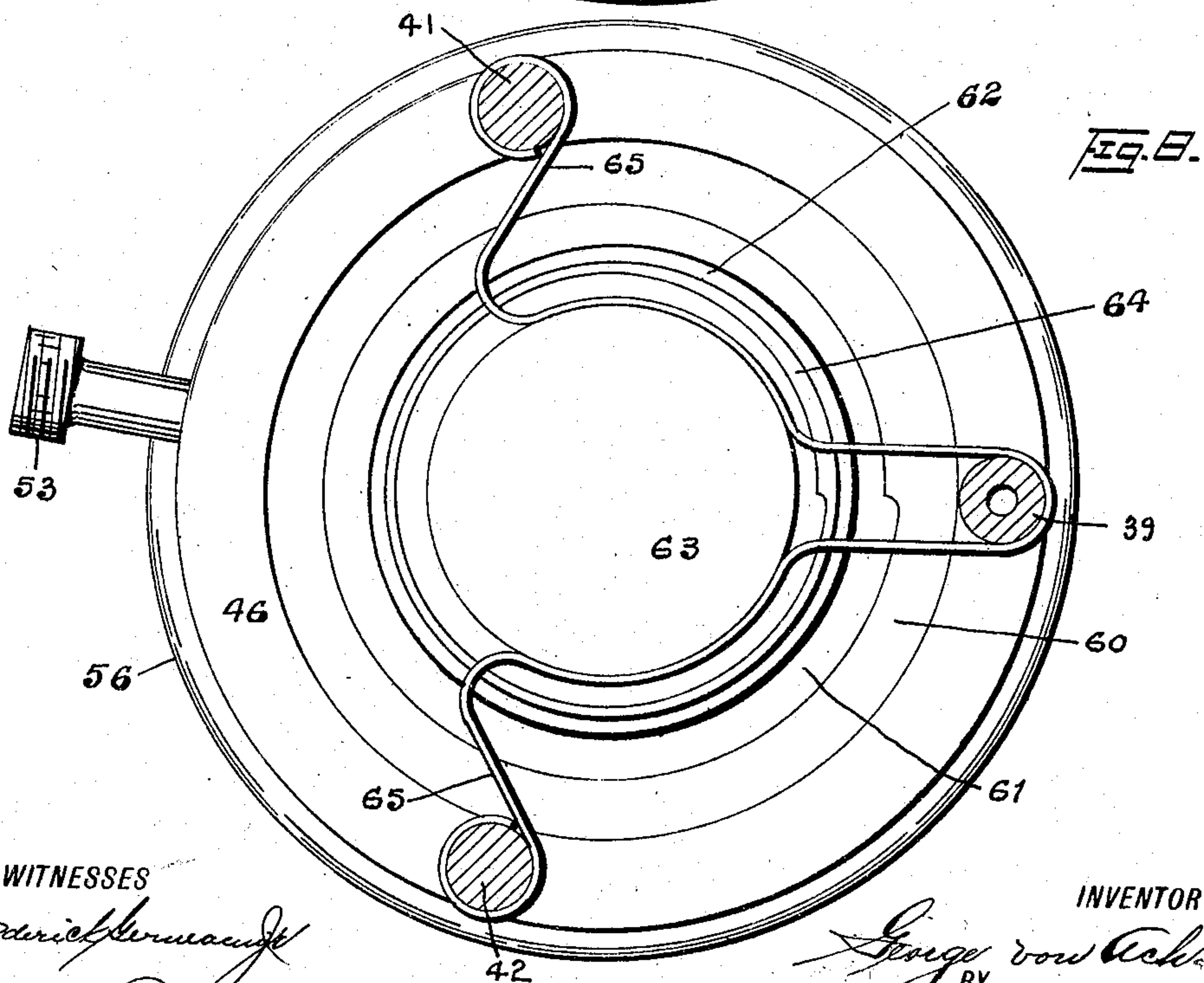


Fig. 8.

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5 SHEETS—SHEET 5.

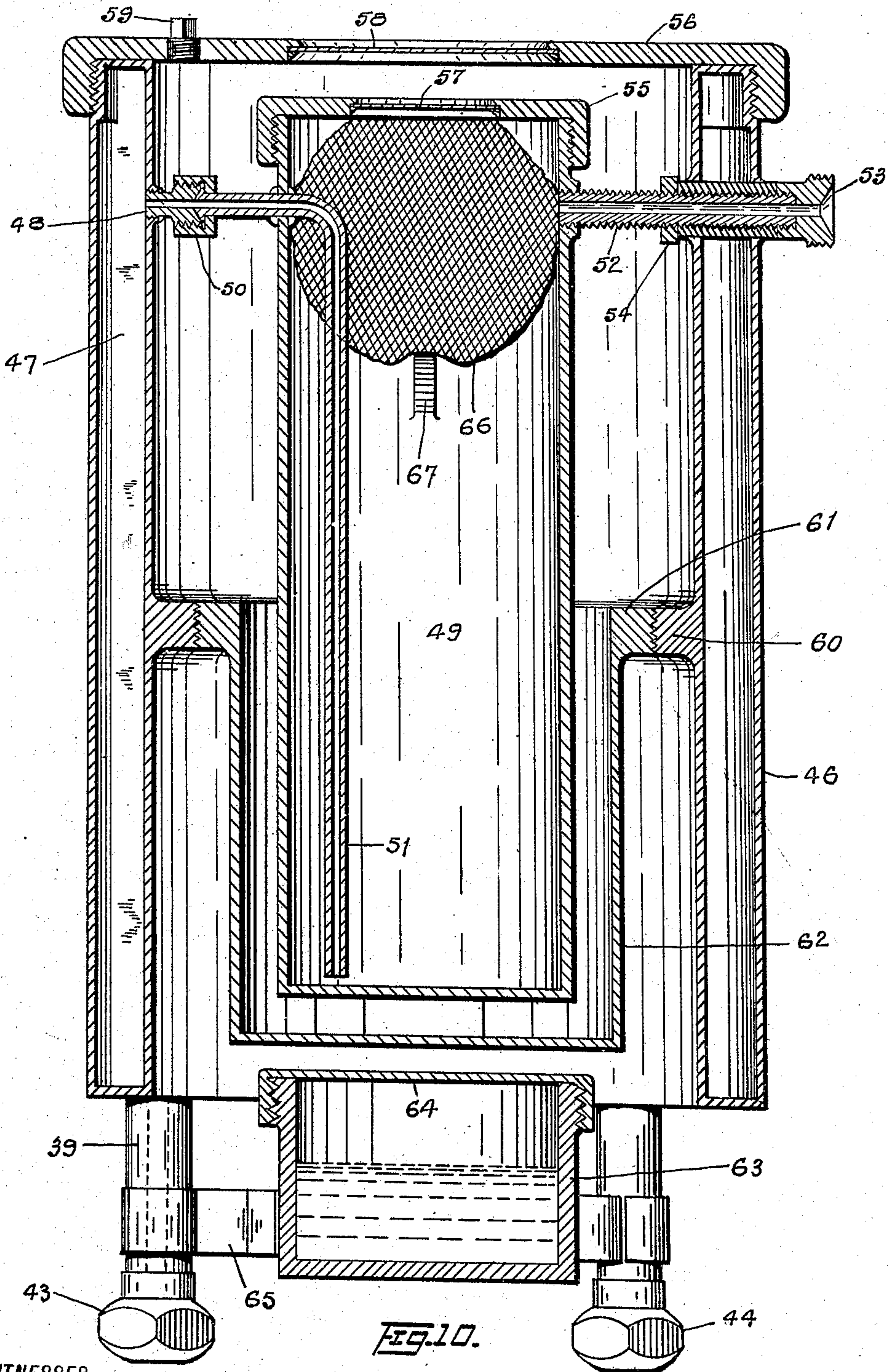


FIG. 10.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR HOLDING AND ADMINISTERING GASES.

No. 923,752.

Specification of Letters Patent.

Patented June 1, 1909.

Application filed December 2, 1908. Serial No. 465,654.

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 Holding and Administering Gases, of which the following is a specification.

The objects of this invention are to provide an apparatus for administering gases to patients which can be taken apart and packed in a suit-case or the like for transportation; to thus provide an apparatus particularly adapted for emergency cases or transient use by physicians or nurses; to enable either a single gas or a mixture of gases to be administered; to enable the gas to be administered either moist or dry, and either cold or warm; to secure a safe and convenient construction; to provide access to the various parts of the apparatus for repair or the like, 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 corresponding parts in each of the several figures, Figure 1 is a side elevation of the lower or gas storage portion of my apparatus, and Fig. 2 is a plan of the same; Fig. 3 is a vertical section taken on line 3—3, Fig. 2; Fig. 4 is a central sectional view of a certain gage-protecting check; Fig. 5 is a sectional view of a certain three-way valve, showing the ports and connections; Fig. 6 is a front elevation of the upper or gas-administering portion of my apparatus, and Fig. 7 is a side elevation of the same; Fig. 8 is an underneath view taken on line 8—8, Fig. 7, and Fig. 9 is a top plan; Fig. 10 is a central vertical section of the upper or gas-administering portion, taken on line 10—10, Fig. 9.

In said drawings, 10 indicates the cylindrical lower portion of my device, constructed of sheet-metal, and having a removable base 11, normally connected to the cylinder 10 by means of a set screw 12, to hold said cylinder in stable upright position. The said cylindrical portion 10 provides upper and lower chambers 13 and 14, which are independent of each other. Between said chambers is a space 15, to which access is had by means of a sliding door 16. From the top of the lower chamber 14 an outlet pipe 17 leads up through a passage 18 of the upper chamber beyond the top thereof, and

a corresponding outlet pipe 19 leads from the top of the upper chamber 13. A folding handle 20 of any suitable and ordinary construction is provided upon the side of the cylindrical portion 10 for lifting and carrying the same. These two outlet pipes 17 and 19 are provided above the top of the cylindrical portion 10 with valves 21 and 22, respectively, and beyond which valves the two pipes bend inwardly toward each other by elbows 22, 23 and enter the casing 24 of a centrally located three-way valve 25. This valve, as shown in detail in Fig. 5, is adapted to connect the two elbows 22 and 23 by its diametric port 26, and at the same time place them in communication with the lower duct 27 of the valve casing, or else be turned to connect them with the upper duct 28 by means of its branch port 261. The said lower duct 27 leads to a pressure gage 29, and which pressure gage serves to measure the quantity of gas in the chambers below. Preferably a check device is placed between the three-way valve and pressure gage, as at 30, for the protection of the gage. This check device, as shown in Fig. 4, comprises transverse plates 31, 32 near together and having separated apertures 33, 34 through which the gas must find its way. Any other suitable and well-known construction could be used equally well, however, such as a single plate or plug with a very minute hole in it. When the three-way valve 25 is given a half turn from the position shown in Fig. 5, the gas from either of the chambers can pass through said valve and into the pipe connections 36. Obviously the flow of gas from either chamber is controlled by means of the valves 21, 22. The pipe 36 leads through a pressure regulator 37 of any common and well-known construction adapted to reduce the pressure of gas as desired, and from this regulator the gas passes through a T-connection 38 to an upwardly leading pipe 39 which constitutes one of three legs adapted to support the upper part of my apparatus. The said T-connection 38 rests upon the top of the cylindrical lower portion 10, and is secured thereto as at 40, whereby firmness is given to the pipe 39. The other two legs are formed by rods 41, 42 extending upward from the elbow connections 22, 23 before described. All the said three legs are adapted to be disconnected at a given horizontal plane above the devices already described by means of couplings 43, 44 and 45.

These three legs support the upper portion of my improved apparatus, which upper portion comprises an annular cylindrical outer reservoir 46, into the bottom of which the hollow leg or pipe 39 opens. This reservoir has adjacent to the said entrance of the pipe 39 a vertical partition 47, and from the opposite side of said partition, near the top of the reservoir, an outlet pipe 48 leads therefrom. A central cylindrical inner reservoir 49 is located within the outer reservoir, and through the side wall of the inner reservoir near its top leads the said outlet pipe 48 from the outer reservoir. Between the two reservoirs the said pipe is provided with a detachable coupling 50, and after entering the inner reservoir the said pipe bends downward and extends nearly to the bottom of the inner reservoir, as at 51. Near the top of the inner reservoir and diametrically opposite the pipe 48, is an outlet pipe 52 which also passes through the walls of the outer reservoir 46 and receives a coupling member 53 for the attachment of an administering tube (not shown in Fig. 10). Preferably the said discharge tube 52 is exteriorly threaded and screws through all three walls of the reservoirs, as shown, a lock nut 54 being applied between the outer and inner reservoirs. Both the inner and outer reservoirs are provided with screw caps 55, 56, respectively, and which caps have weakened portions 57, 58, respectively, for greater safety in case of too high pressure. Furthermore, the cap 56 on the outer reservoir has a vent plug 59.

In case it should be desired to administer warm gas, the outer reservoir is provided at its inner walls, between its top and bottom, with a threaded flange 60, into which is screwed the corresponding flange 61 of a cup 62 adapted to inclose the lower end of the inner reservoir, as clearly shown in Fig. 10. By filling this cup 62 with hot water and which water can also extend upward between the two reservoirs, the gas in the inner reservoir can be warmed. Furthermore, because of the caps on the two reservoirs there can be no leakage. In case the heat of warm water should not be sufficient, I provide beneath the cup 62 a receptacle 63 which can contain an inflammable liquid to be ignited and positively heat the water in the cup 62 around the inner reservoir. In case this is done, the water jacket around the inner reservoir is not filled more than half full. A cap 64 is provided for the receptacle 63, and said receptacle is removably held by means of a resilient band 65 extending around the three legs 39, 41 and 42. Of course, when the inner reservoir is heated as thus described, the vent 59 should be removed from the top of the outer reservoir.

In order to secure moist gas, if desired, a sponge 66 is shown filling the upper part of the inner reservoir and through which the

gas must pass in order to escape by the outlet 52. This sponge is preferably supported by arms 67 upon the inner walls of the inner reservoir, and obviously by saturating the sponge, the gas will be moistened. Or, if preferred, water or other liquid could be placed in the bottom of the inner reservoir to cover the mouth of the tube 51.

In case cold dry gas was to be used, the entire upper part of my apparatus need not be mounted upon the lower part, but the administering tube could be coupled directly to the upright pipe 39, as indicated at 68 in Fig. 7.

In operation, the gas desired is allowed to pass from the lower portion 10 of my apparatus to the three-way valve 25 by means of the controlling valves 21, 22 and beyond said valve 25 the gas goes through the pressure regulator 37 and up the pipe 39. It thus enters the outer reservoir 46 at its lower part on one side of the vertical partition 47 and is compelled to circulate clear around the annular chamber before escaping through the outlet 48 on the other side of the partition to the inner reservoir. Here the gas is still subject to the warming effect of the jacket between the two reservoirs, and furthermore the sponge 66 being in use, the gas diffuses all through said sponge and becomes thoroughly moistened. It then passes through the outlet pipe 52 to the administering tube, and so to the patient. Any desired condition of the gas, either cold dry, cold moist, warm dry or warm moist, can be readily obtained.

The gas containers 13 and 14 of the lower portion of my improved apparatus can be filled through a filling plug 69 providing access to one of the elbows, as 23, in Fig. 6.

Having thus described the invention, what I claim is:

1. In apparatus of the character described, the combination with a lower gas container, and upper gas administering means comprising outer and inner reservoirs with a water jacket between, of pipe connections between said lower and upper portions locating them at a distance apart, means cooperating with said pipe connections to hold the upper and lower portions in relative position, and means for disconnecting all of said supporting means between the upper and lower portions.

2. In apparatus of the character described, the combination of a portion providing top and bottom gas-containers separated by a median space, means providing access to said space, an outlet pipe leading from the bottom container, an outlet from the top container, controlling valves in said outlets, gas administering means comprising outer and inner reservoirs, a pipe leading to one of said reservoirs, a connection placing said pipe in communication with the said outlets from

the gas containers, a pressure gage in connection with said connection, and a three-way valve in said connection.

3. In an apparatus of the character described, the combination of a lower portion providing top and bottom gas containers separated by a middle space, means providing access to said space, an outlet pipe leading from the top of the bottom container upward through the top container without communicating therewith, an outlet from the top container through its top, gas administering means comprising outer and inner reservoirs arranged above said lower portion, pipe connections between said upper and lower portions of the apparatus, auxiliary means for supporting said upper portion on the lower portion, and means for uncoupling said connections and supporting means intermediate of the upper and lower portions.

4. In an apparatus of the character described, the combination of a lower portion providing top and bottom gas containers separated by a median chamber, means providing access to said chamber, an outlet pipe leading from the bottom container up above the top container without communicating therewith, an outlet from the top container, valves in said outlets, gas administering means detachably supported on said lower portion, a detachable connection between said outlets and said gas administering means, and a detachable base for the bottom of said lower portion.

5. In an apparatus of the character described, the combination of a lower portion providing top and bottom gas containers separated by a median chamber, means providing access to said chamber, an outlet pipe leading from the top of the bottom container up through the top container without communicating therewith, an outlet from the top container through its top, valves in said outlets, a single pipe connected to said outlets, and means for administering gas from said single pipe.

6. In an apparatus of the character described, the combination of a lower portion providing a plurality of gas containers, valved outlets from said containers at the top of said lower portion, a valve casing in communication with said outlets, a pressure gage in communication with said valve casing, a fourth duct leading from said valve casing, a three-way valve in said valve casing adapted to connect said outlets with either the pressure gage or said duct, and gas administering means in communication with said duct.

7. In an apparatus of the character described, the combination of a lower portion providing a plurality of gas containers, valved outlets from said containers at the top of said lower portion, a valve casing in communication with said outlets, a pressure

gage in communication with said valve casing, a fourth duct leading from said valve casing, a three-way valve in said valve casing, gas administering means comprising outer and inner reservoirs above said lower portion and in communication with said duct, and means for supporting said gas administering means on said lower portion.

8. In an apparatus of the character described, the combination of a lower portion providing a plurality of gas containers, valved outlets from said containers at the top of said lower portion, a valve casing in communication with said outlets, a pressure gage in communication with said valve casing, a fourth duct leading from said valve casing horizontally and bending upward and being supported at said bend upon the lower portion of the apparatus, gas administering means comprising outer and inner reservoirs at the upper end of said duct, and auxiliary supports for said gas administering means.

9. In an apparatus of the character described, the combination of a lower portion providing a plurality of gas containers, valved outlets from said containers at the top of said lower portion bending toward each other, a valve casing between the ends of said outlets, a pressure gage in communication with said valve casing, a fourth duct leading horizontally from said valve casing and bending upward and supported at said bend upon the lower portion of the apparatus, auxiliary supports extending upward from the bends of the outlets, and gas administering means comprising outer and inner reservoirs upon the upper ends of said supports and duct.

10. In an apparatus of the character described, the combination of an outer annular reservoir having a partition extending from top to bottom, means for admitting gas at one side of said partition at the bottom of the reservoir, and an inner reservoir within said outer reservoir, a pipe leading from the outer reservoir near its top at the side of its partition opposite the said inlet, and extending into the inner reservoir, and an outlet pipe leading through the wall of the inner reservoir and both walls of the outer reservoir, said pipes supporting said inner reservoir.

11. In an apparatus of the character described, the combination of an outer annular reservoir, an inner reservoir within said outer reservoir, a cap adapted to close the central space of the outer reservoir at its top, means for supplying gas to the lower part of said outer reservoir, a pipe leading from the upper part of said outer reservoir into the inner reservoir, an outlet pipe leading from said inner reservoir, and heating means mounted at the lower open end of the outer reservoir beneath the inner reservoir.

12. In an apparatus of the character de-

scribed, the combination of an outer annular reservoir, an inner reservoir within said outer reservoir and providing a space between itself and the outer reservoir, means for supplying gas to the lower part of said outer reservoir, a connecting pipe leading from the upper part of the outer reservoir into the inner reservoir and having detachable coupling means between the reservoirs, a threaded outlet pipe extending through the wall of the inner reservoir and the walls of the outer reservoir, and means for supporting a sponge in said inner reservoir between its said inlet and outlet.

13. In an apparatus of the character described, the combination of an outer annular reservoir having its central space open at the bottom and having an interior flange intermediate of its top and bottom, a depending cup removably supported on said flange, an inner reservoir within said outer reservoir and depending into the said cup at a distance from the walls thereof, means for supplying gas to the outer reservoir, a pipe

connecting the outer and inner reservoirs, and an outlet for said inner reservoir.

14. In an apparatus of the character described, the combination of an outer annular reservoir having its central space open at the bottom and having an interior flange intermediate of its top and bottom, a depending cup removably supported on said flange, a removable cap for the upper end of the central space of the outer reservoir, an inner reservoir within said outer reservoir and extending into said cup, a pipe leading from the outer reservoir into the inner reservoir and having detachable coupling means between the reservoirs, a threaded outlet pipe extending through the wall of the inner reservoir and the walls of the outer reservoir, said two pipes supporting the inner reservoir with a space around it, and means for supplying gas to the outer reservoir.

GEORGE VON ACH.

In the presence of—

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FREDERICK GERMAN, Jr.