No. 812,388. PATENTED FEB. 13, 1906.

P. H. WIDMAN.

ACETYLENE GAS APPARATUS.

APPLICATION FILED MAY 13, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

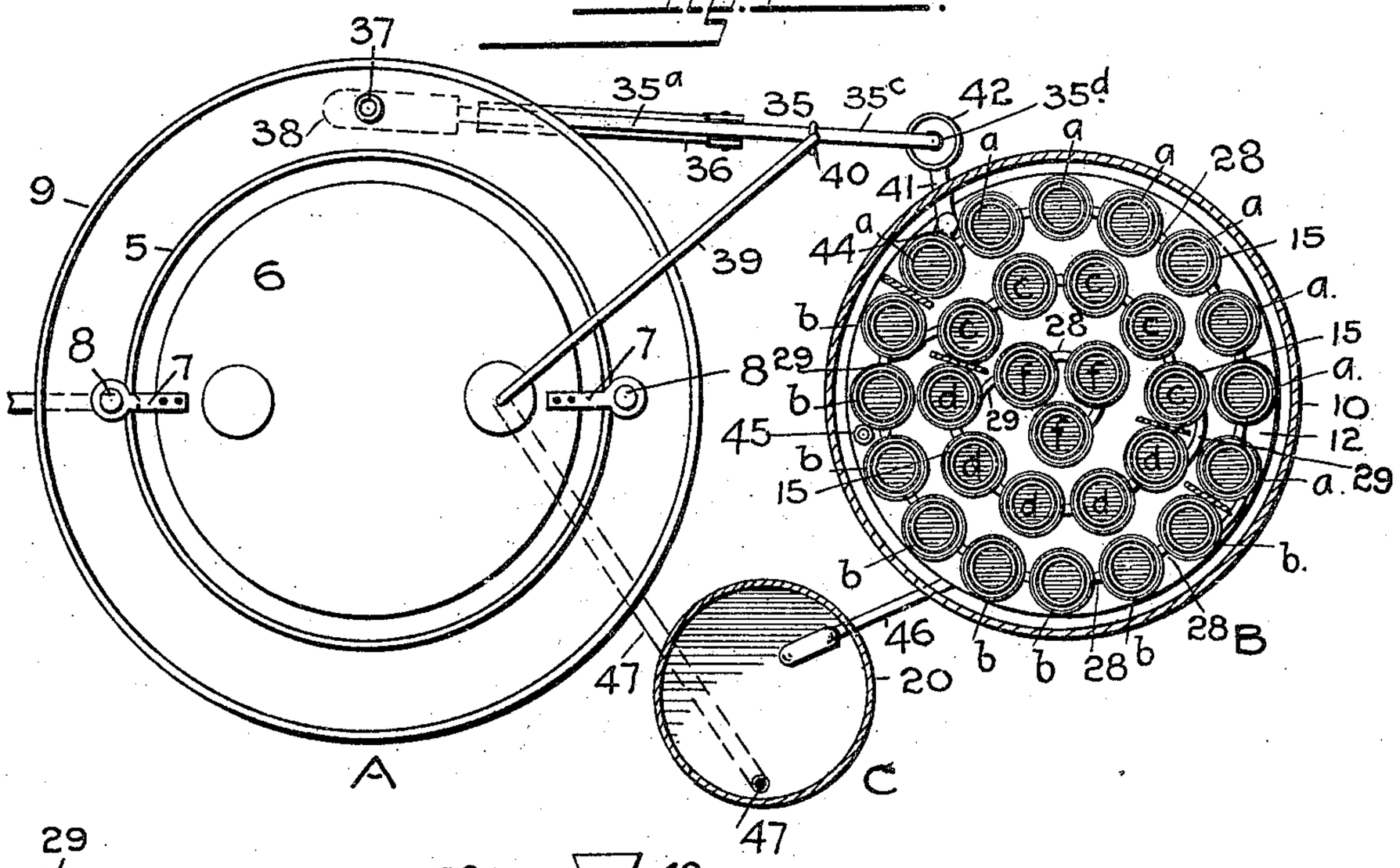

Fig. 3.

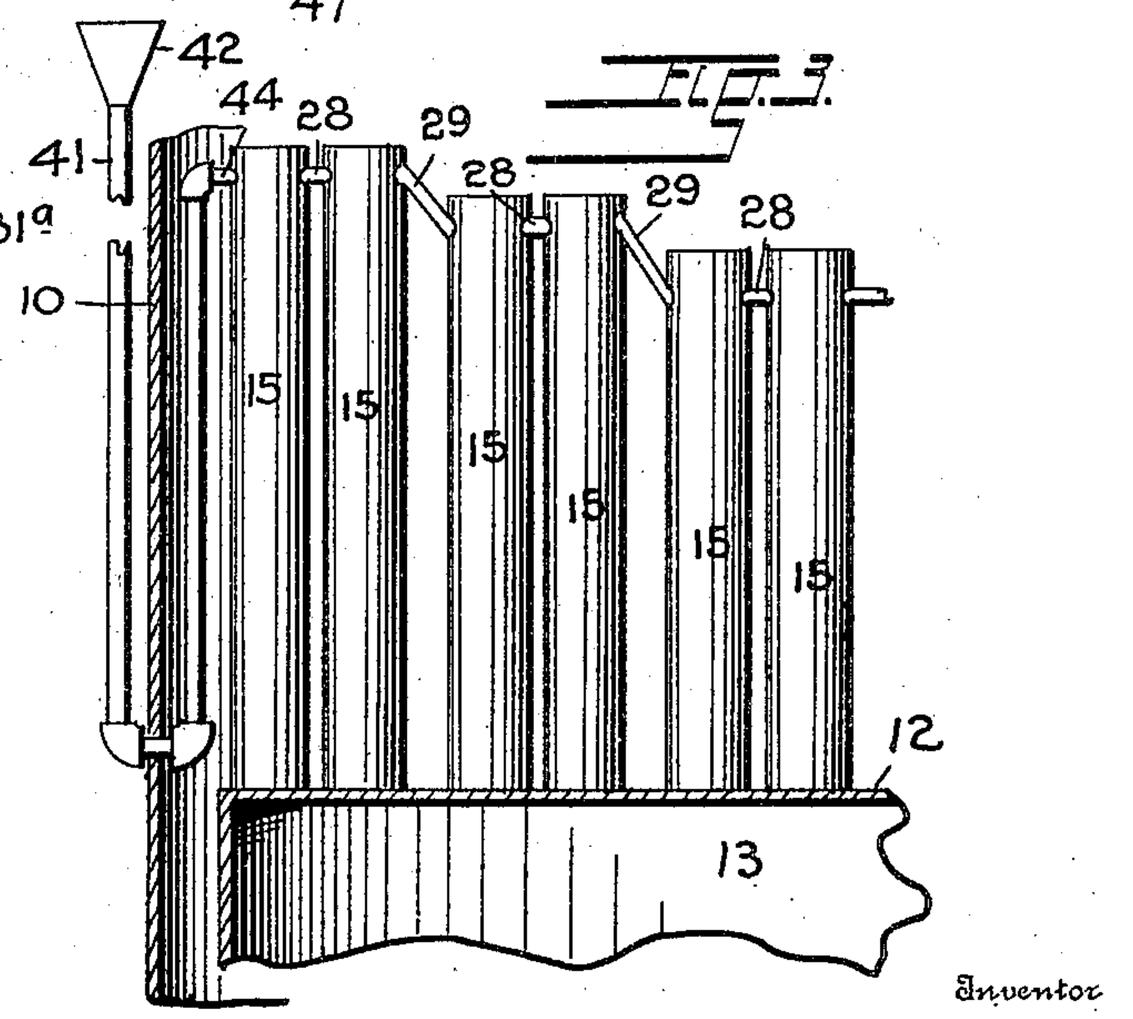

Fig. 2.

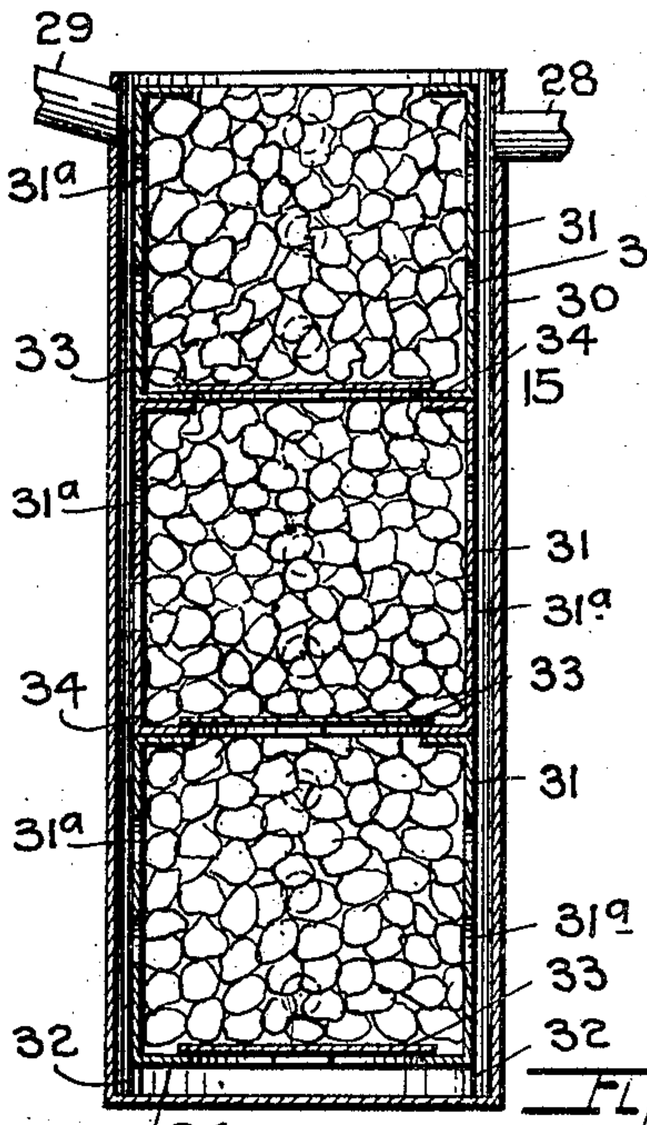

Fig. 4.

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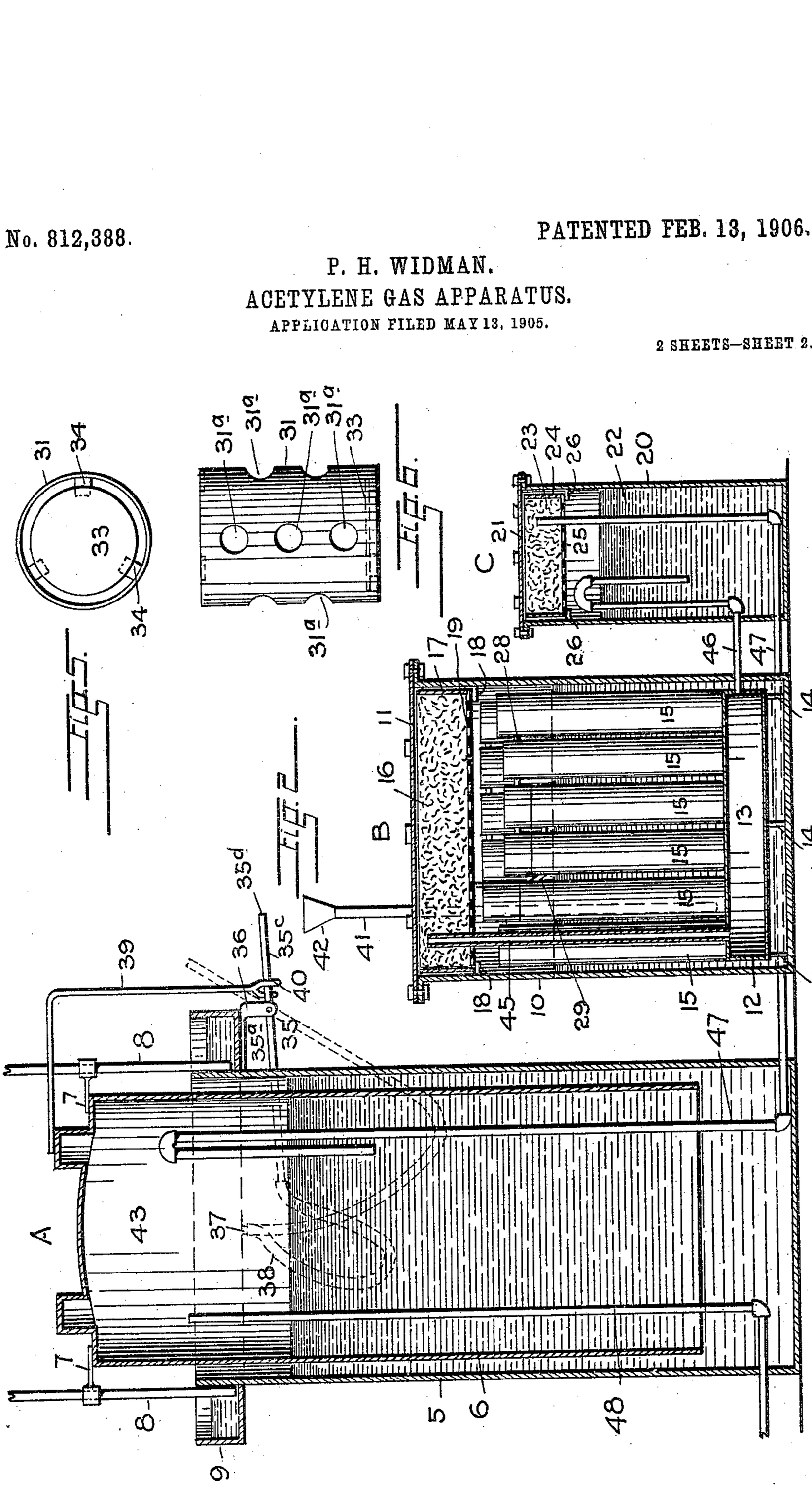
2 SHEETS—SHEET 2.



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ACETYLENE-GAS APPARATUS.

No. 812,388. Specification of Letters Patent. Patented Feb. 13, 1906.

Application filed May 13, 1905. Serial No. 260,337.

To all whom it may concern:

Be it known that I, PAUL H. WIDMAN, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Acetylene-Gas Apparatus, of which the following is a specification.

My invention relates to new and useful improvements in acetylene-gas apparatus, its object being to provide a very simple and highly effective device in the construction of which all gaskets, spring-valves, and stuffing-boxes usually found in apparatus of this kind are omitted and which will economically generate, store, and deliver a pure illuminating-gas. Its peculiar construction and arrangement of parts render my device absolutely safe, the gas being generated in proportion to the amount consumed, while by reason of the carbid-holders being arranged in series the generator may be replenished at any time without interfering with the working of the apparatus and without endangering life or property. I attain these objects by the mechanism illustrated in the accompanying drawings, in the several figures of which like parts are similarly indicated, and in which—

Figure 1 represents a sectional plan view of the device, the various elements having been shown in their normal relative positions; Fig. 2, a vertical section through the three elements comprising my apparatus and which for the sake of clearness in drawing and description have beeen shown as standing in one vertical plane; Fig. 3, a fragmentary view of a plurality of carbid-holders and water-supply pipe; Fig. 4, an enlarged section through one of the carbid-holders, and Figs. 5 and 6 a plan view and side elevation of one of the carbid-cans comprised in the carbid-holder.

My apparatus consists of three distinct and separate parts—*viz.*, the gasometer A, the generator B, and the purifier C.

The gasometer A consists of a cylindrical tank or reservoir 5, containing the vertically-movable dome 6, sealed by the water in practice contained in said tank and guided in its vertical movement by apertured guide-brackets 7, fixed on the dome and engaging the vertically and upwardly extending guide-rods 8, secured to the tank 5. Tank 5 is furthermore provided along its upper edge with an outwardly-extending annular water-trough or belt 9, which may be supplied from any convenient source and which furnishes the water required to develop the gas in the generator. The latter, B, consists of a cylindrical tank or reservoir 10, normally closed by a removable cover 11. A shallow water-tight hollow cylindrical vessel 12, spaced from the sides of reservoir 10 at a point near its bottom plate, forms the cooling-chamber 13, through which the gas is led on its way to the gasometer and which is supported by suitable legs 14. Tank 12 furthermore supports the carbid-holders 15, a detailed description of which will hereinafter be given. Located above the carbid-holders and below cover 11 is a purifying-chamber 16, formed by a pan 17, containing charcoal or other suitable gas-purifying agent, and supported by inwardly-extending lugs 18 on tank 10. Pan 17, the peripheral side of which should closely adjoin the inner surface of tank 10, has been provided with a foraminated bottom plate 19, which affords passage for the gases from the reservoir to chamber 16.

The purifier C consists of a tank 20, smaller in proportion than tank 10 and, like the latter, normally closed by a removable cover 21. Tank 20 is divided into two compartments 22 and 23 by a pan 24, identical in form to pan 17, its perforated bottom 25 being supported on lugs 26, arranged along the inside of the tank. Pan 24, like pan 17, contains charcoal or other suitable gas-purifying substance, while the lower compartment 22 is partially filled with water, as shown in Fig. 2.

The above-mentioned carbid-holders 15 being substantially duplicates of each other are arranged inside tank 15 on top of the cooling-chamber 13 in concentric rings, as shown in Fig. 1. They are divided into four series *a*, *b*, *c*, and *d* by vertically-extending partitions 27, while a fifth series *f* is placed in the center of the tank.

To render the drawings more comprehensible, the various holders comprising each series have been designated by the above-mentioned reference-letters.

The carbid-holders comprised in each of the series *a*, *b*, *c*, *d*, and *f* are consecutively connected near their upper edges by means of short pipes or conduits 28, while the first holder of each series is connected with the last holder of the preceding one by means of pipes 29. To aid the flow of water from each series to the following, the carbid-hold-

ers contained in each following one have been made shorter than those in the preceding one, as has been illustrated in Fig. 3, in which for lack of room the series have been shown to contain but two holders each. Carbid-holders 15 consist of a tubular shell or casing 30, open on top and containing the carbid-cans 31, the lower one of which is elevated from the bottom of the casing by suitable supports 32 and which support the upper ones. Each can is provided with a loose bottom plate 33, spaced from its side and resting on lugs 34, which extend inwardly from the lower edge of the can. Vertically-extending series of holes 31[a] in the side of the cans affords ingress for the water, as will be hereinafter explained.

In Fig. 4 the holder has been shown to contain three superposed cans of carbid; but it will be understood that as many cans as desired may be used, their only object being to facilitate handling when the holders are being replenished. The water necessary in generating the gas is supplied from the annular water-trough 9 through a pipe 35, pivotally attached to a bracket 36, secured to the bottom of the trough and connected with an outlet 37 in said trough by means of a flexible connection 38. Pipe 35 thus supported forms a lever with a long and a short arm, (designated, respectively, by 35[a] and 35[c].) A downwardly-extending arm 39, secured to the upper part of dome 7, has a forked lower extremity 40, which in practice straddles the outer arm 35[c] of pipe 35. The water flowing from trough 9 through pipe 35 is delivered into the vertically-extending pipe 41 on the generator, and which to this end has been provided with a funnel-shaped orifice 42 at its upper extremity.

It will be readily understood that by the above-described arrangement the supply of water to the generator, and consequently the volume of gas generated, will be automatically controlled by the amount of gas consumed.

The upper part 43 of dome 6 forms an expansible gas-reservoir, which is supplied from the generator and the gas in which, owing to its varying quantity and pressure, permits the dome to rise and fall. When the latter is in a raised position by reason of the reservoir containing a large quantity of gas, the orifice 35[d] of pipe 35 will be raised above the level of the water in trough 9, owing to the weight of the long arm 35[a], which exceeding that of the outer and shorter arm 35[c] causes the outer extremity of the latter to ascend with the forked extremity 40 of rod 39. The water-supply to the generator thus having been stopped, no more gas will be supplied to the gas-reservoir until by reason of the diminution of gas the dome commences to descend, which will cause fork 40 to engage arm 35[c] of pipe 35 and forcing it downwardly will once more bring the orifice 35[d] below the water-level in trough 9. The water-supply to the generator thus being resumed, more gas will be generated and conveyed to reservoir 43. Pipe 41, by which the gas-generator is supplied with water, enters tank 10 at a point near the upper surface of the cooling-chamber (see Fig. 3) and extending upwardly terminates at 44 in the first one of the carbid-holders constituting series *a*. The water entering shell 30 will flow to the bottom thereof and entering the lower carbid-can 31 will cause the formation of gas. When the lower part of the contents of the can has thus been consumed and the residue the carbid drop to the bottom of the casing, the water on rising in the can will enter through the lowest hole 31[a] until another quantity of carbid has been exhausted, when the water will enter the next opening 31[a], the operation thus being continued until all the carbid contained in the holders has been consumed, and the water having risen to the upper edge of the casing 30 will pass through pipe 28 into the next holder, in which the above-described operation is repeated. The water thus flowing from one holder to the other causes the formation of gas to be progressively continued in the various holders constituting the series and in the various series by means of the communicating pipes 29. The gas thus generated in tank 10 rises through the foraminated bottom 18 into the purifying-chamber 17 and passing through the substance contained therein descends through a pipe 45, which extends into chamber 16 and connects same with the cooling-chamber 13. The gas passing through the last-named chamber, in which it is cooled, enters the purifier C by means of a pipe 46, which extending upwardly in tank 20 is provided at its upper extremity with a gooseneck, which extends below the level of the water, with which tank 20 has previously been supplied. The gas thus being discharged is further cooled and washed and having bubbled to the surface of the water rises into the second purifying-chamber 23 through the perforated plate 25.

Having passed through the purifying substance contained in pan 24, the gas is now led to the gas-reservoir 43 in the gasometer by a pipe 47, which extending upwardly in tank 5 is, like pipe 46, provided with a gooseneck extremity, through which the gas is discharged below the level of the water contained in the tank. The gas thus being once more washed rises in the dome in a pure state and is supplied to the various rooms of the house through the discharge-pipe 48.

It will be readily understood that the gas produced by my apparatus, as described above, being cooled in chamber 13, twice purified in chambers 16 and 23, and washed in the purifying-tank, as well as in reservoir 5, will be pure and free from foreign matter

when discharged through pipe 47, a proof of which may be found by the clear white light of the gas produced by the machine now in operation.

A further advantage of the peculiar construction of my apparatus lies in its absolute safety, the danger of explosion having been practically eliminated by the sealing of the orifices of pipes 46 and 47, which discharging below the water-level in tanks 5 and 20 effectively seal the gas-spaces in said tanks from each other as well as from the generator.

The arrangement of the carbid-holders as shown and described permits the removal and replenishment of the exhausted holders during the operation of the device by removing cover 11 and pan 17, the quantity of gas contained at one time in the generator being too small to cause serious inconvenience.

It will be understood that details of constructions, as well as the arrangement of parts, may be varied without departing from the spirit of the invention.

Having thus explained my invention, what I claim is—

1. In an acetylene-gas apparatus, in combination with a gasometer, a generating-chamber surmounted by a purifying-chamber and constructed to contain a gas-generating agent, a water-tight cooling-chamber within said generating-chamber, means to admit the gas generated from said agent into said purifying-chamber, and means to conduct the gas from the purifying-chamber through said cooling-chamber to the gasometer.

2. In an acetylene-gas apparatus, in combination with a gasometer, a generating-chamber, a horizontally-disposed foraminated partition dividing said generating-chamber into a generating-compartment constructed to contain a gas-generating substance and a purifying-chamber constructed to contain a purifying agent, and a water-tight cooling-chamber inside said generating-chamber spaced from its walls and communicating with the gasometer and with the purifying-chamber.

3. In an acetylene-gas apparatus, in combination an expandible gasometer, a generator, two separated chambers each containing a purifying agent, a cooling-chamber, a tank, means to convey gas from said generator successively through one of said purifier-chambers and said cooling-chamber into said tank, and means to conduct the gas arising above the surface of the water in the latter, through the second purifying-chamber into the gasometer and below the surface of the water contained therein.

4. In an acetylene-gas apparatus, a generator comprising a closed receptacle, a horizontally-disposed perforated partition dividing the interior of said receptacle into a generating and a superposed purifying compartment, a water-tight vessel located inside and spaced from the former, a series of intercommunicating shells located on said vessel, each shell containing a plurality of superposed, apertured carbid-holders.

5. In an acetylene-gas apparatus, in combination a gasometer, a water-reservoir comprising a generating-chamber and a superposed purifying-chamber, a cooling-chamber within said generating-chamber, a tank, a second purifying-chamber surmounting same, means to convey gas from the generating-chamber successively through the first-named purifying-chamber and the cooling-chamber into the tank, and means to conduct the gas arising above the surface of the water in the latter through the second purifying-chamber into the gasometer and below the surface of the water contained therein.

6. In an acetylene-gas apparatus, in combination a gasometer, a water-reservoir comprising a generating-chamber and a superposed purifying-chamber, a cooling-chamber within said generating-chamber, a tank, means to convey gas from the generating-chamber successively through the purifying-chamber and the cooling-chamber into the tank, and means to conduct the gas arising above the surface of the water in the latter, into the gasometer and below the surface of the water contained therein.

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

PAUL H. WIDMAN.

Witnesses:
G. J. ROLLANDET,
K. M. STUMP.