

No. 709,344.

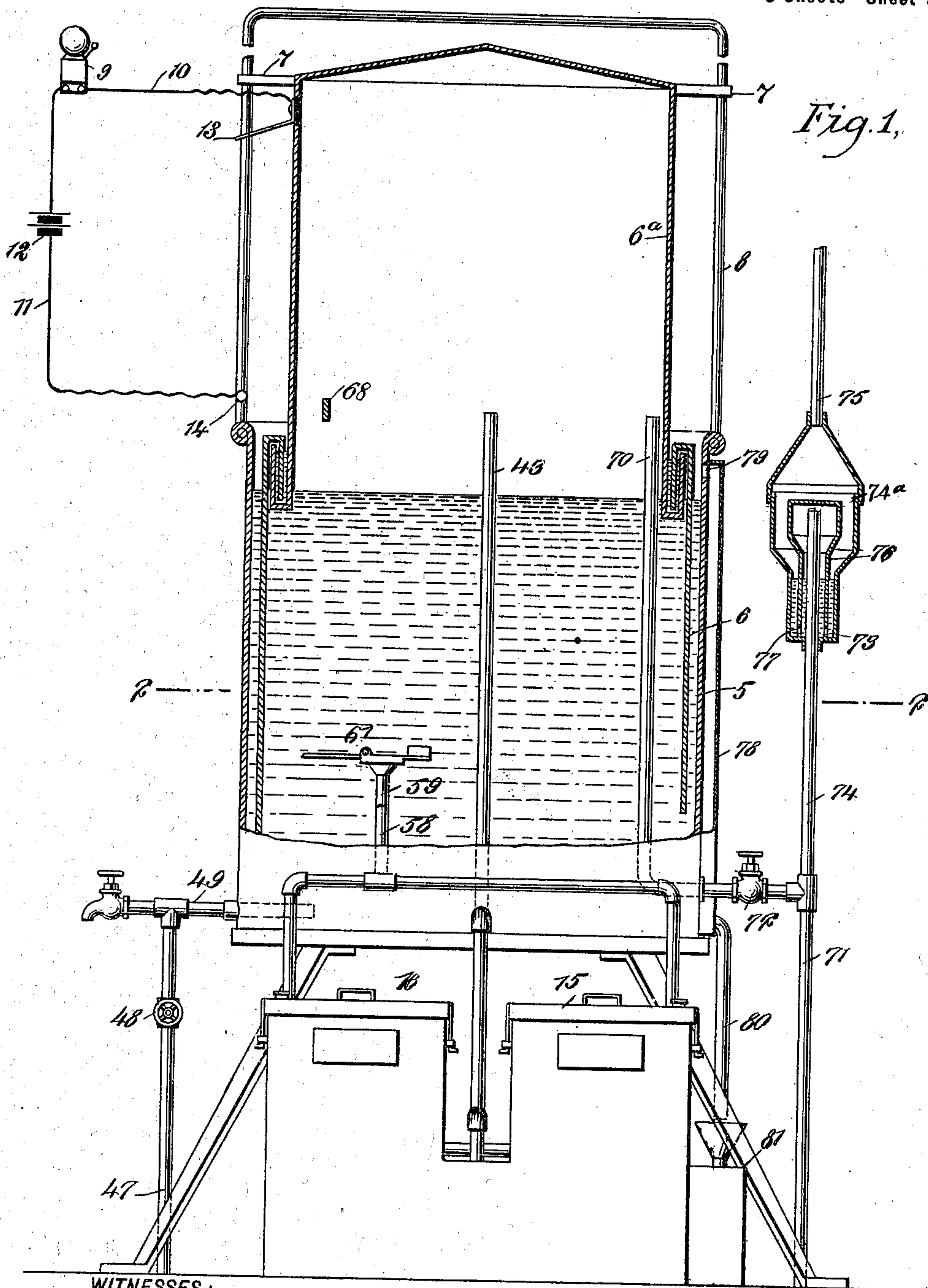
Patented Sept. 16, 1902.

C. W. METCALF.
ACETYLENE GAS GENERATOR.

(Application filed Sept. 9, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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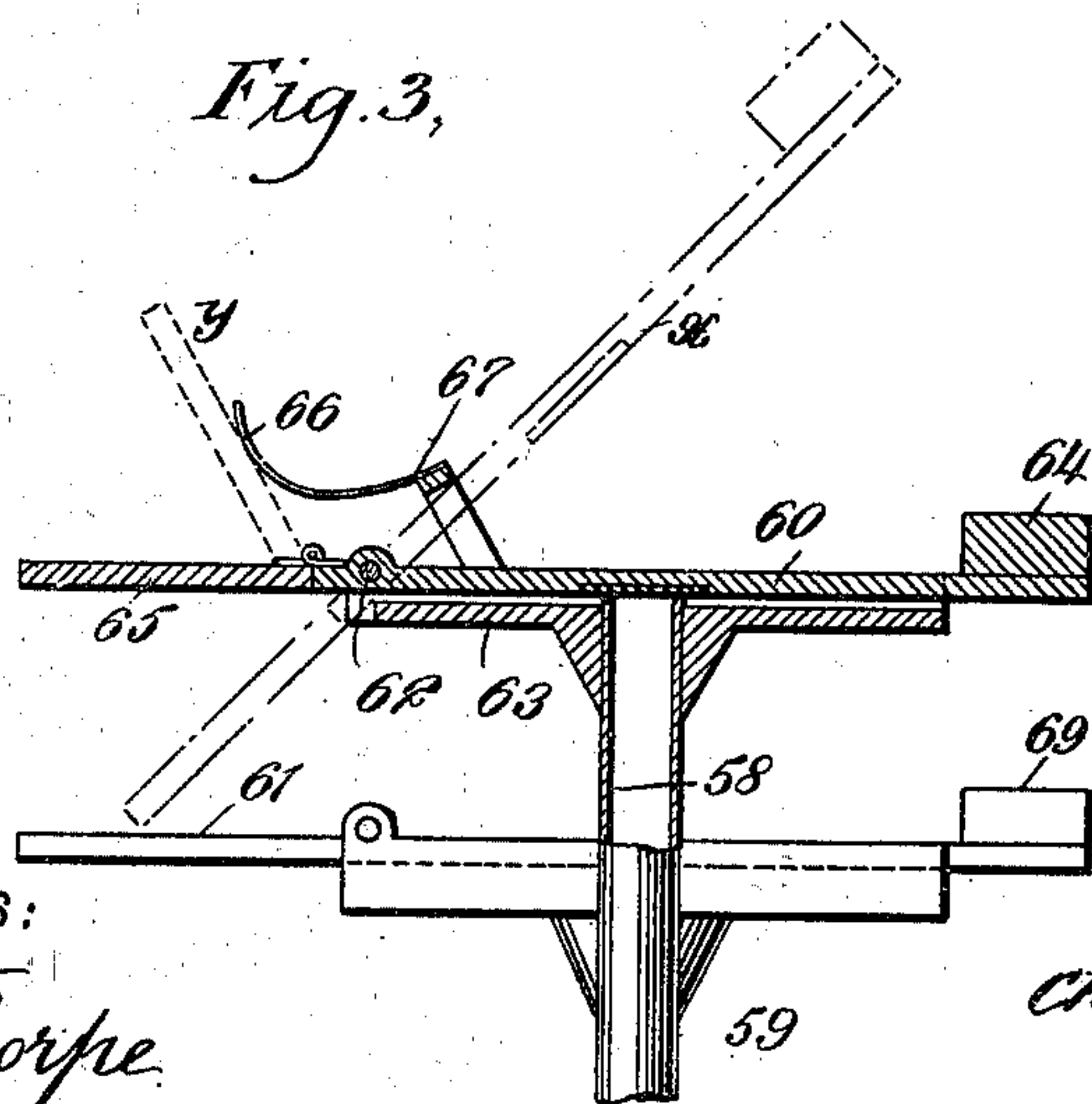
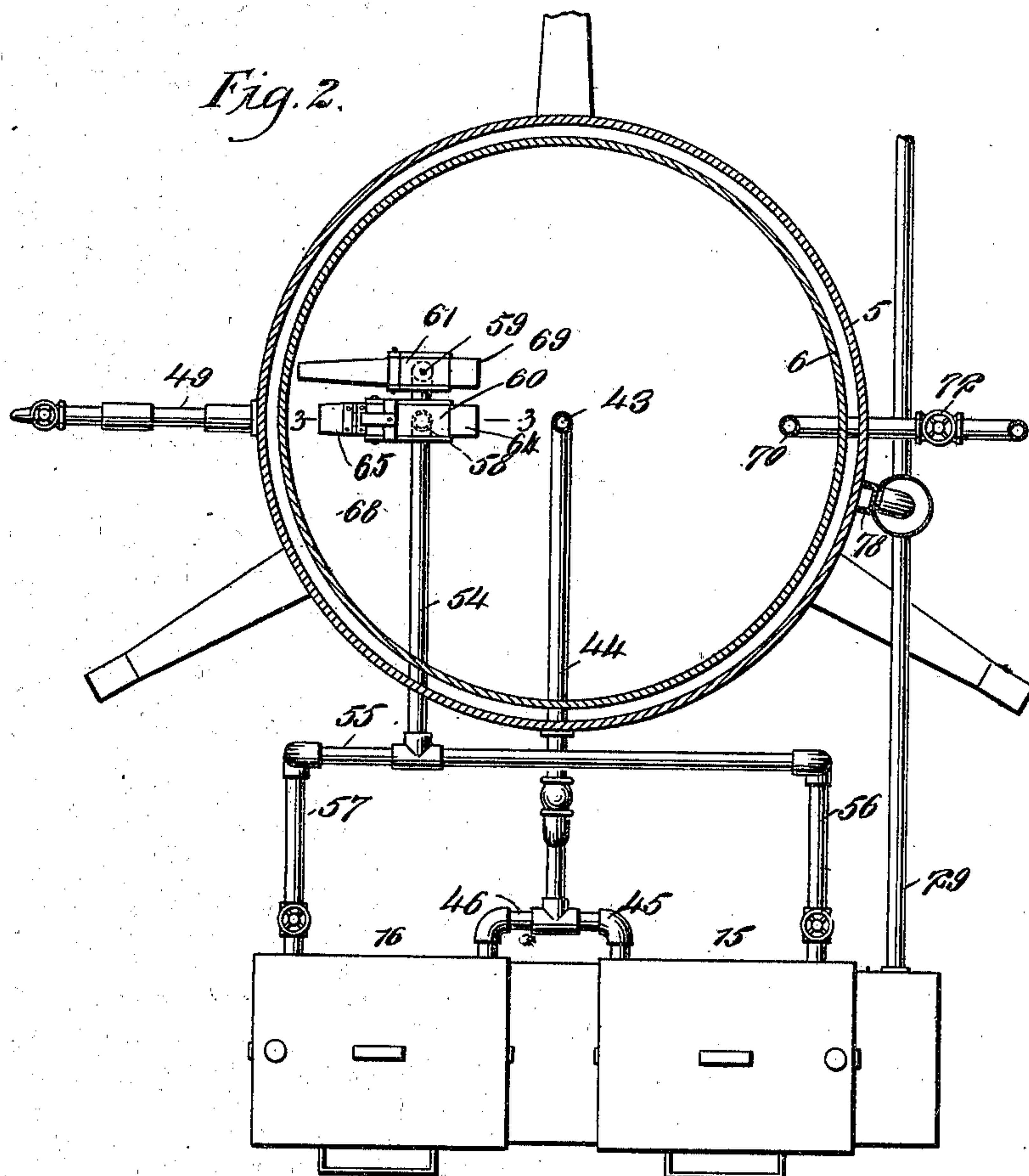
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3 Sheets—Sheet 2.



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3 Sheets—Sheet 3.

Fig. 4.

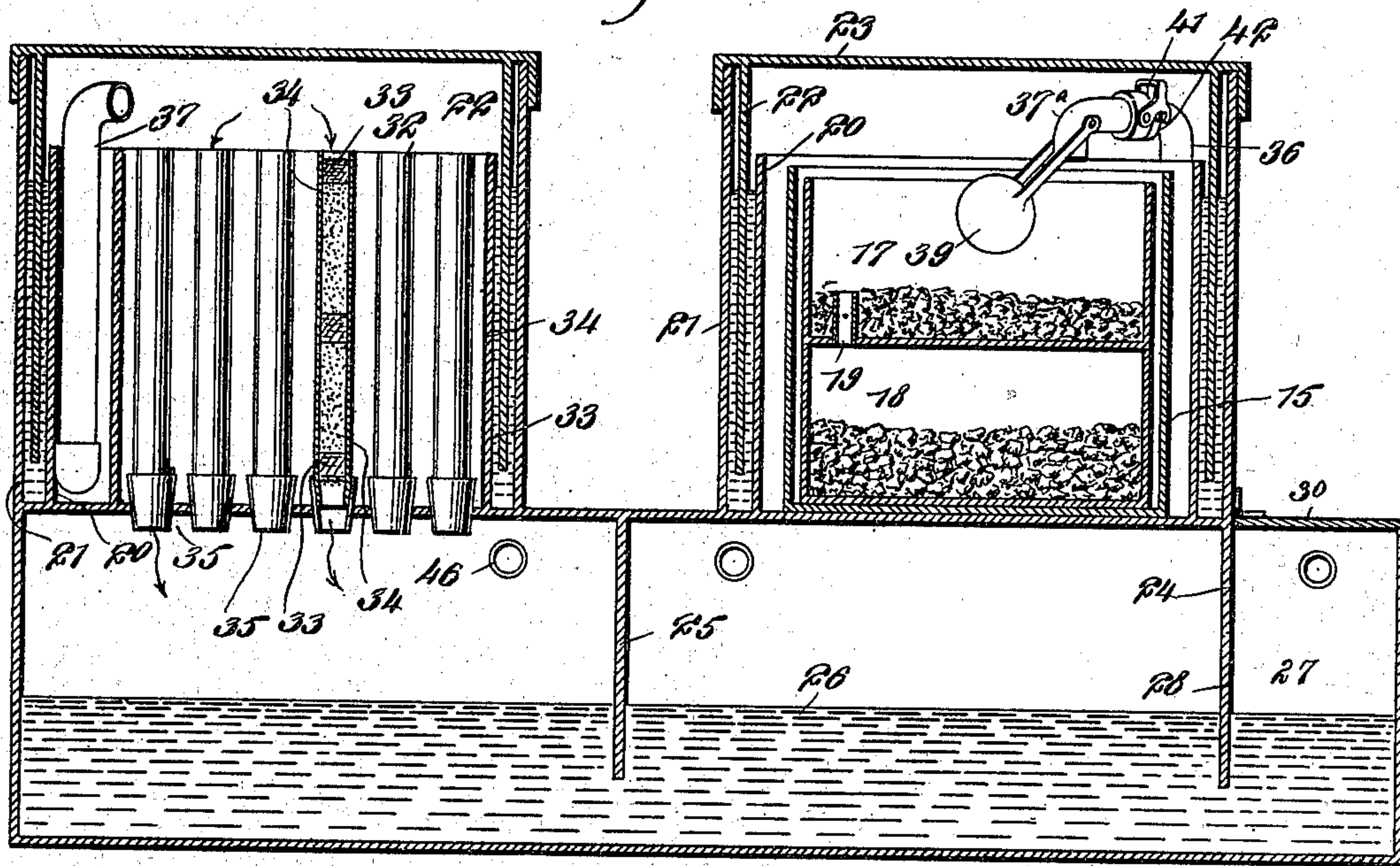


Fig. 5.

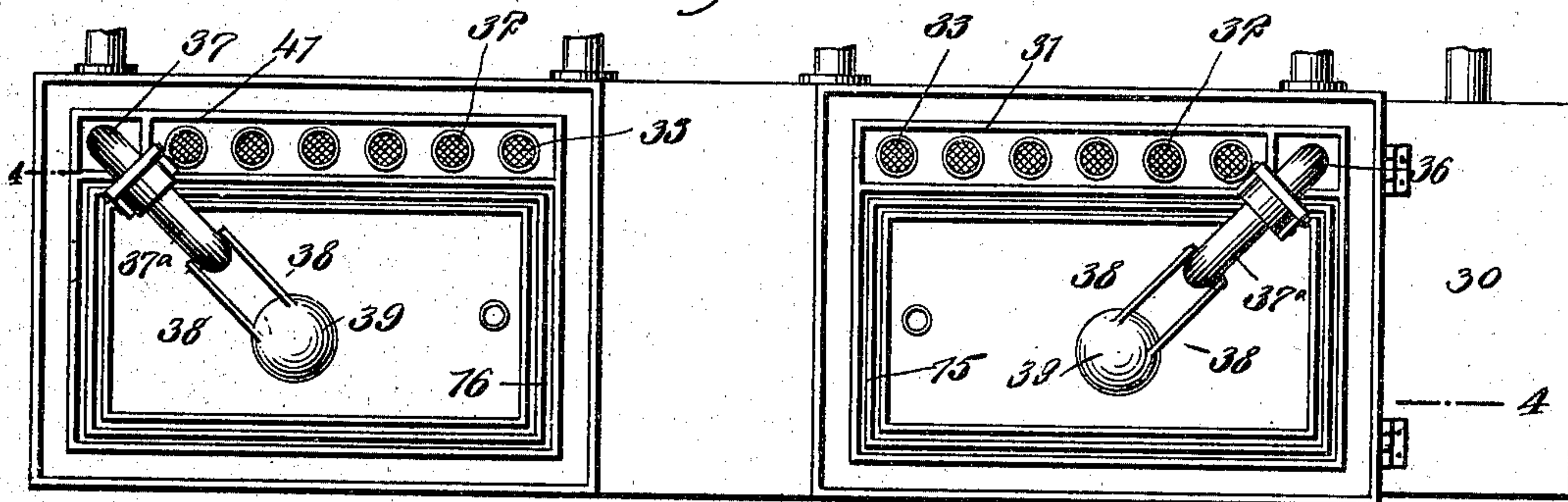
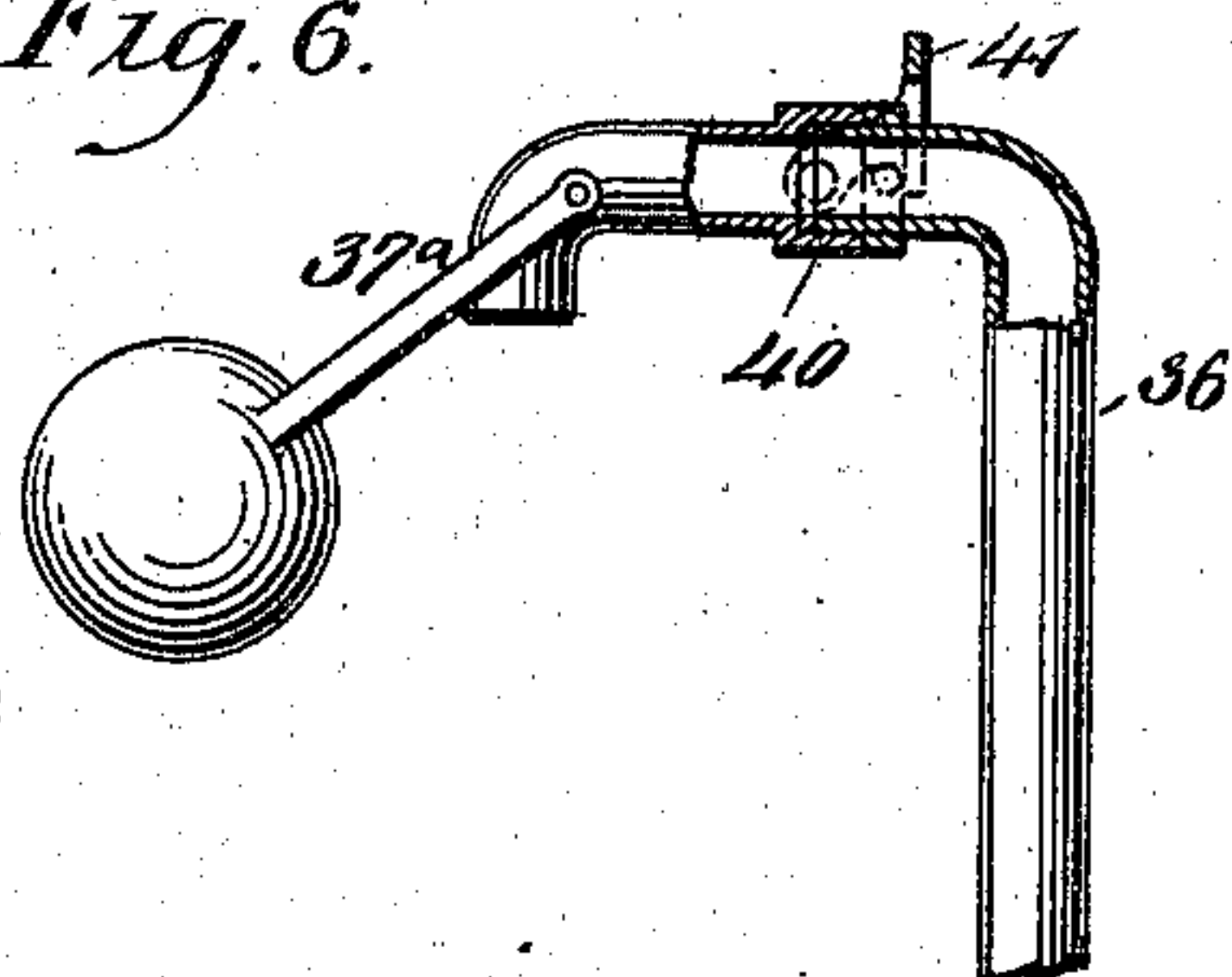


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES WESLEY METCALF, OF TUCSON, ARIZONA TERRITORY.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 709,344, dated September 16, 1902.

Application filed September 9, 1901. Serial No. 74,814. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WESLEY METCALF, a citizen of the United States, and a resident of Tucson, in the county of Pima and Territory of Arizona, have invented new and useful Improvements in Gas-Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in machines for generating gas from calcium carbide for illuminating or other purposes; and the object is to provide a machine of this character that shall be practically automatic in its operation and in which a pure and clean gas will be formed.

I will describe a gas-machine embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of a gas-machine embodying my invention. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 is a section on the line 4 4 of Fig. 5 and showing the generating mechanism employed. Fig. 5 is a plan view thereof with the carbide-holder covers removed; and Fig. 6 is an elevation, partly in section, of one of the automatically-controlled water-supply pipes employed.

Referring to the drawings, 5 designates the fixed portion of a gasometer, and 6 6^a the two section bell thereof, the bell being guided in its vertical movement by yokes 7 on the opposite sides of the bell engaging with guide-rods 8, extending upward on the fixed portion. The bell is made in two telescopic sections 6 and 6^a as a means to enlarge the capacity should an extra amount of gas enter the gasometer. The two sections are united by a water-seal joint, as clearly shown in Fig. 1.

It is designed in this machine that when the water in the gasometer becomes low that an alarm shall be given. For this purpose I have here shown a bell 9, arranged in electric circuit 10 11, comprising a battery 12, the wire 10 of the circuit being connected with a spring contact-finger 13, attached to the bell, but insulated therefrom, and the wire 11 is

connected with a contact-point 14, attached to one of the rods 8.

The generator comprises two carbide-holders 15 and 16, and in each holder are pans 17 and 18, the pan 17 resting on the lower pan 18, and the upper pan has communication with the lower pan through a tube 19, extending upward from the bottom of said upper pan, this tube being of sufficient height to retain water in the upper pan to form the gas from the carbide in said upper pan. After the carbide shall have been reduced the water will overflow through the tube 19 and into the lower pan, thus forming the gas from the carbide in said lower pan. It will here be stated that while but one of the generators is to be used at a time, for instance, the carbide in the generator 15 may be turned into gas, and then the operation will take place in the generator 16, as will be hereinafter described. Each holder is placed within a case comprising an inner wall 20 and an outer wall 21, these walls being spaced apart to form a water-receiver, into which an annular flange 22 of the cover 23 is designed to pass, thus providing a water seal to prevent the escape of gas. The covers 23 may be held in closed position by any suitable means. The generators are supported on and have communication with a gas-receiving tank 24, and at its central portion or between the generators a partition 25 extends downward, terminating at a short distance above the bottom of the tank, but below the level of water 26 contained in said tank. The water within the tank forms a seal to prevent the gas from passing from one compartment to the other. At one end of the tank is a trough 27, into which a partition 28 extends below the level of the water. From the upper portion of this trough an overflow or discharge pipe 29 extends. The trough is provided with a cover 30, so that water may be placed within the tank should it become too low or below the bottoms of the partitions 25 or 28. The gas formed in the generators passes upward over the tops of the pans and then passes downward through a scrubber at one side of the generator. This scrubber is designed to clean the gas or to remove a certain portion of the moisture therefrom in passing from the generator into the gas-receiving tank. At one

side of each generator a casing 31 is formed, within which is placed a series of tubes 32, and in each tube are layers of felt 33. Between the layers of felt are placed layers of sand 34. The lower ends of the tubes 32 enter cups 35, which discharge into the tanks 24.

A water-supply pipe 36 is designed to discharge water onto the carbid in the generator 15, and a supply-pipe 37 is provided for the generators 16. Each supply-pipe is provided with a removable nozzle 37^a, and connected to the stems of the valves of the nozzles by means of arms 38 are float-valves 39. Therefore as the water rises in an upper pan it will move the float-valve thereof upward, closing the valve of the nozzle, consequently cutting off the supply of water until the level thereof falls sufficiently low to permit the float-valve to open the supply-valve. The object in making the nozzle removable from the supply-pipes is to permit upon removing said nozzles the removal of the carbid-pans when it is desired to place new carbid therein. As here shown, the nozzle 37 has a joint-section 40, adapted to engage over the horizontally-disposed end of the supply-pipe when it is locked in this position by means of a yoke 41, pivoted to the part 40 and engaging with pins 42 on the supply-pipe. A suitable packing may be placed between the abutting ends of the pipe and nozzle.

The supply-pipe of the gasometer consists of a section 43, extended upward in the gasometer and above the level of the water contained therein, and a horizontal section 44, which leads to the fixed portion of the gasometer and has branch connections 45 and 46 with the gas-tank 24. As here shown, these branches communicate with the interior of the said tank at opposite sides of the partitions 25.

A main water-supply pipe 47 leads from any suitable source of supply—such, for instance, as a water-reservoir or a street-main. This pipe 47 is provided with a valve 48 and communicates with a pipe 49, leading into the gasometer and through which water may be supplied to the interior of said gasometer.

As a means of automatically supplying water to the generators I employ a pipe 54, which extends into the gasometer and at its outer end connects with a pipe 55, having its ends 56 and 57 leading into the generators. Within the gasometer the pipe 54 has upwardly-extending members 58 and 59. The branch or member 58 has a large bore, through which water may freely pass for supplying the generators, but the member 59 has a very small opening or bore and is lower than the pipe 58. These members or branches 58 and 59 are controlled, respectively, by swinging valves 60 and 61. As clearly shown in Fig. 3, the valve 60 has hinged swinging connections 62 with a platform 63 on the upper end of the member 58, and it is held normally against the upper end of the said member or pipe 58 by means of a weight 64 at the free

end of the body portion. At the opposite end an extension 65 is pivotally connected to said body portion. As here shown, this extension 65 is so hinged as to swing readily upward with relation to the body portion, but to maintain a position parallel to the body portion when pressure is exerted on the upper side of said extension. The extension 65 is prevented from moving too far upward relatively to the body portion by means of a spring yielding finger 66, attached to a cross-bar 67, mounted on said body portion. The valve 61 for controlling the inlet to the pipe or member 59 is mounted to swing on the upper end of said pipe or member and has an extension 61^a, that is adapted to be engaged by a part carried by the gasometer-bell. As here shown, this part consists of a bar 68, attached to the bell and designed not only to engage the valve 61, but to engage the extension 65 of the valve 60 to move said valve to its open position, as indicated by the dotted line *x* in Fig. 3, permitting water to pass freely through the pipes 54 and 55 and into either one of the generating devices. It will be understood that the main supply of water is through the pipe 58 and that the pipe 59 acts as a switch and permits but a small amount of water to enter. When the gasometer-bell moves nearly to its lowermost position, the bar 68 will pass over the end of the extension 65, permitting the valve 60 to move to its closing position, so that upon an upward movement of the bell and after a new supply of water is provided to the gasometer the said bar will engage against the under surface of the extension 65, causing it to swing freely upward, as indicated by the dotted line *y* in Fig. 3, so that the bar may pass the same on its upward movement. This valve 61 is provided with a closing-weight 69 at its free end. When the generator is out of operation and there is no gas in the holder, the bar 68 rests on the end 61^a of the valve 61, so that under such conditions the pipe 59 is open, and when it is desired to generate gas the valve in the pipe 56 or 57 is opened, permitting water to flow from the pipe 59 to a generator until sufficient gas is generated to lift the bell above the valve 61 and thereafter the valve 60 controls the water-supply. When all the carbid is used up in a generator, the water rises therein and the supply is shut off by the float 39 and the gas-bell then sinks down past the valve 60 and opens the pipe 59, so when the valve in the next generator is opened the water will flow through the pipe 59. As the opening of the pipe 59 is small, it will feed but a small amount of water, and thus prevent too sudden an evolution of gas, as would be the case should the valve 60 be opened wide at the outset.

A pipe 70 for conveying gas to the point of consumption—such, for instance, as to a gas burner or to a cooking-stove—leads downward from a point above the level of the water and thence outward through the gasometer and connects with a pipe 71. Within the

pipe 70 at the outer side of the gasometer is a cut-off valve 72. Connecting with the pipe 70 is a safety-valve designed to open and permit an escape of excessive pressure of gas that may occur in the gasometer. This safety-valve consists of a shell 73, surrounding and attached to the upper end of a pipe 74, which has communication with the pipes 70 and 71. On the shell 73 is a removable cap 74^a, from which a discharge-pipe 75 leads. This cap 74^a is made removable, so that access may be had to the interior of the valve for cleaning the same. The pipe 74 extends upward in the casing and above the level of water contained in said casing, and surrounding this pipe 74 within the casing is a shell 76, connected at its lower end to the bottom of the casing and closed at its top. It has, however, openings 77 at the bottom. In case of an excessive pressure of gas, the same will pass upward and out through the upper end of the pipe 74, and thus by exerting its pressure on the surface of the water contained in the casing 73 will force said water upward in the casing at the outer side of the shell 76, consequently removing the water from the interior of the shell, permitting the gas to pass out through the opening 77 and thence upward and out through the pipe 75.

Attached to one side of the fixed portion 5 of the gasometer is an overflow-pipe 78, the upper end of which communicates with the interior of the said fixed portion of the gasometer through an opening 79. From the lower end of the overflow-pipe 78 a tube 80 leads and is designed to discharge into the pipe 29. As here shown, a funnel 81 is attached to said pipe 29 underneath the lower or outlet end of the tube 80.

The operation is as follows: Assuming that gas is to be generated in the generator 15, the valve of the branch 57 must be closed, while the valve of the branch 56 is opened. Water passing through the supply-pipe 47 will enter the gasometer through the pipe member 49 until a sufficient supply is placed within the gasometer and, as before mentioned, water will enter the generator or into the upper pan of the generator 15. The generated gas will pass through the scrubber into the tank 24 and thence out through the pipes 44 and 43 into the gasometer-bell and of course will cause the said bell to rise. When the gas in the gasometer-bell becomes partly exhausted, the said bell by moving downward will open the valve 60, as before mentioned, permitting wa-

ter from the gasometer to pass into the generator. Of course when the carbid in the generator 15 becomes exhausted the valve in the branch 56 is to be closed and the valve in the branch 57 opened, and thus gas may be generated in the generator 16. Any moisture that passes into the pipe 43 with the gas may be condensed and drip back into the gas-tank 24.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a gas-machine, a gasometer, a generator, a pipe providing communication between the gasometer and generator, the said pipe at its portion within the gasometer being provided with two upward extensions, one of said extensions having a bore or inlet smaller than the bore or inlet of the other extension, valves controlling the inlets, and means carried by the gasometer-bell for opening the valves one after the other, substantially as specified.

2. In a gas-machine, a gasometer, a generator, a pipe providing communication between the gasometer and generator, the said pipe at its portion within the gasometer, being provided with two upward extensions, one of said extensions having a bore or inlet smaller than the bore or inlet of the other of said extensions, swinging valves controlling the inlets, and means carried by the gasometer-bell for opening the valves, substantially as specified.

3. In a gas-machine, a generator comprising a carbid-holder for receiving pans or the like, a water-sealed casing in which the holder is arranged, means for controlling the supply of water to the holder, and a scrubber in one side of the holder through which the gas is designed to pass, substantially as specified.

4. In a gas-machine, a carbid-holder, a water-supply pipe adjacent the said holder, a cover for said holder extending over said pipe, a removable nozzle for the pipe adapted to extend into said holder, a yoke for locking the pipe and nozzle together, a valve in the nozzle, and a float having connection with said valve, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES WESLEY METCALF.

Witnesses:

JOHN R. NEVINS,
STUART F. FORBES.