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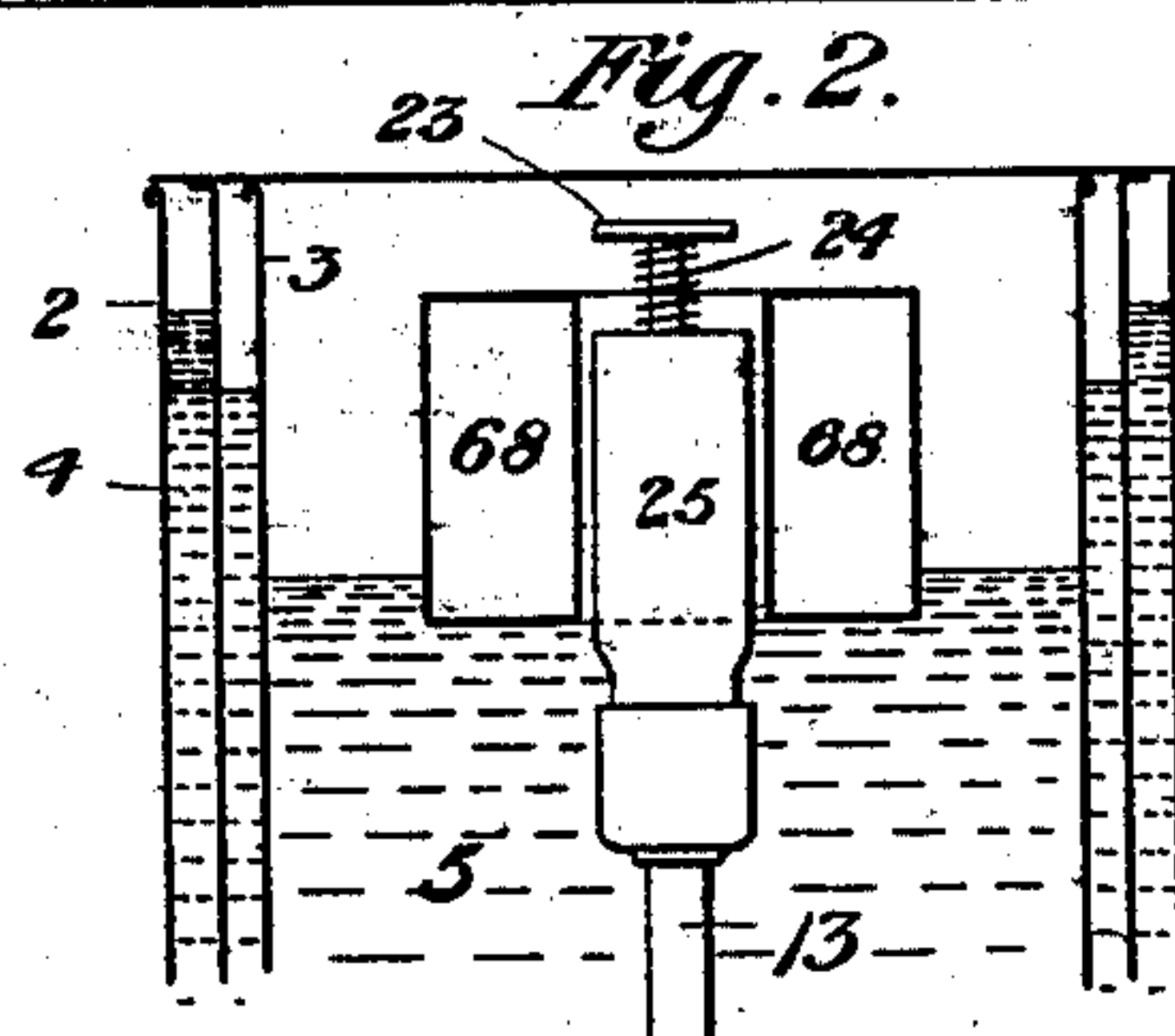
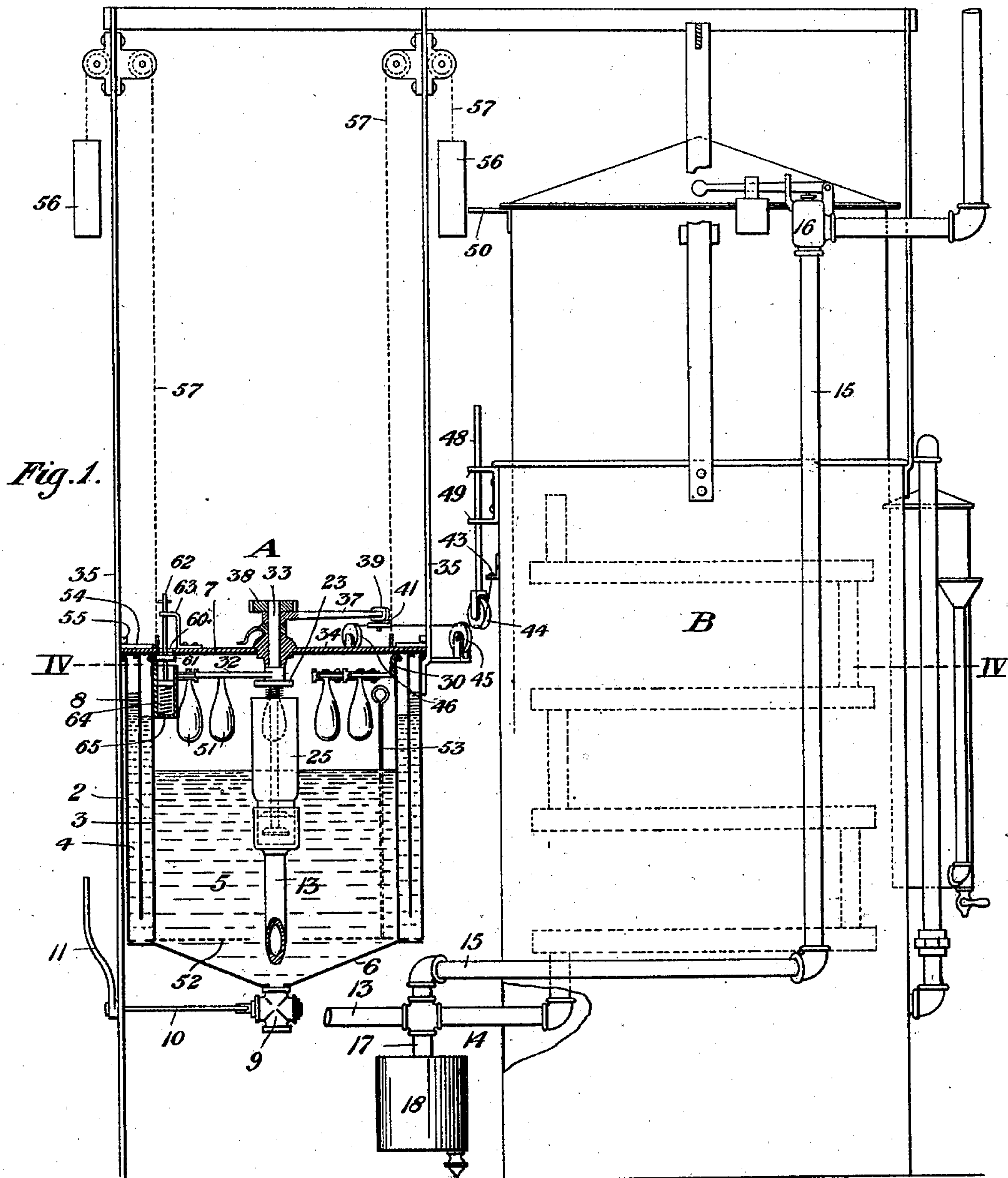
Patented Apr. 2, 1901.

G. W. MacKENZIE.  
ACETYLENE GAS GENERATOR.

(Application filed Feb. 5, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:

*D. Edwards*  
*R. N. Jayman*

Inventor:  
*George W. MacKenzie*  
*By O. M. Clarke*  
*his Attorney*

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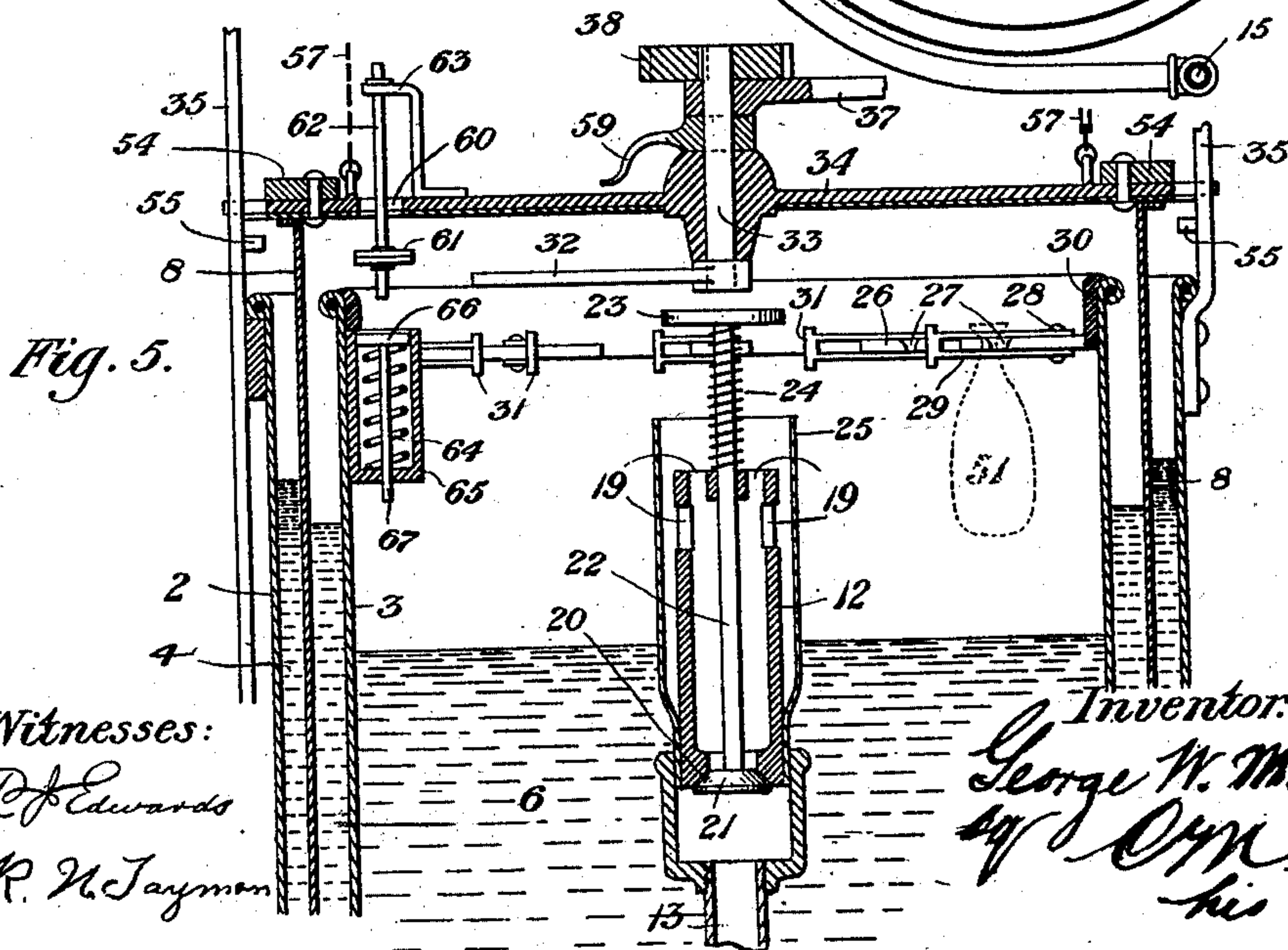
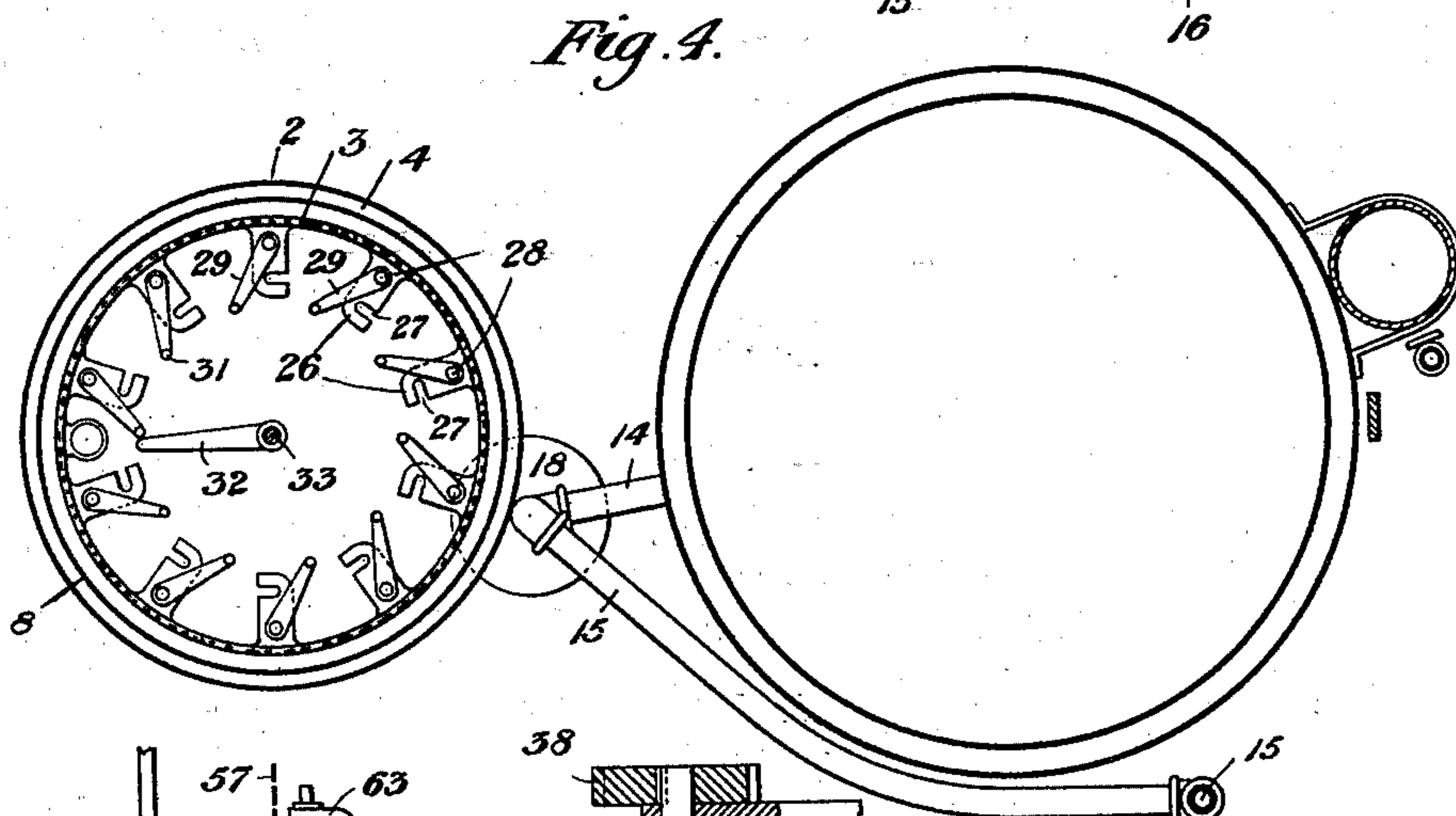
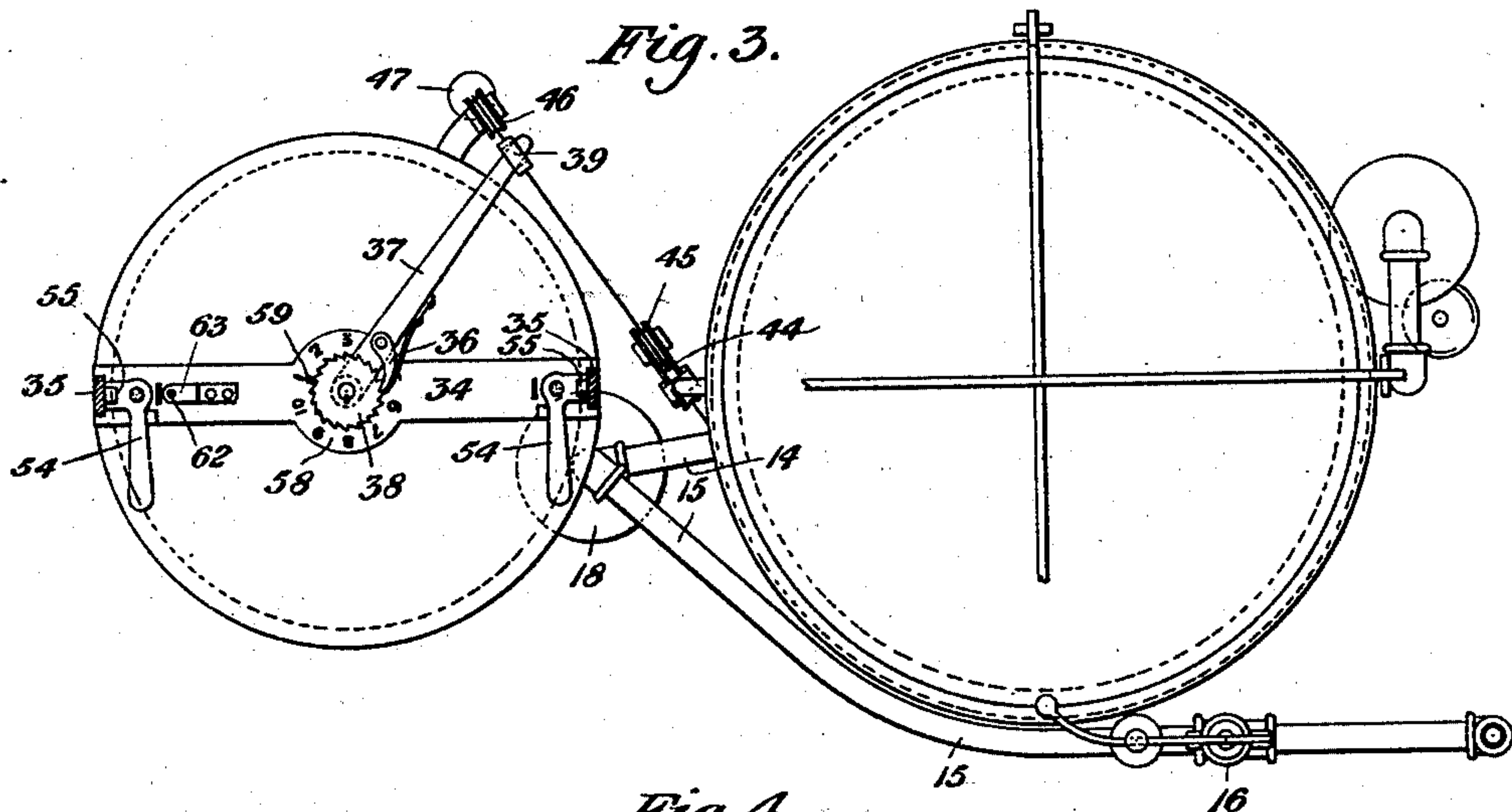
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George W. Mackenzie  
by O. W. Clarke  
his Attorney



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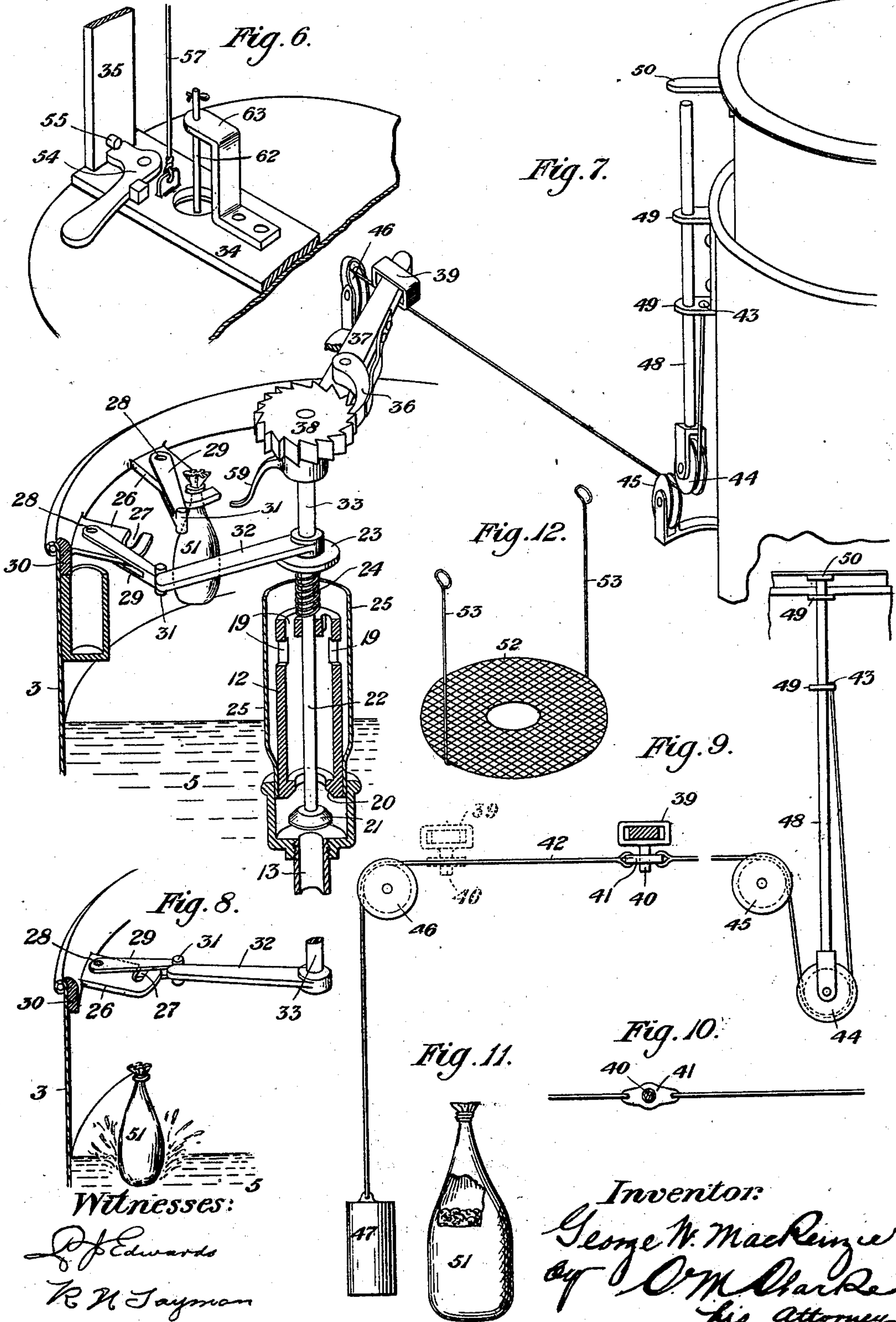
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3 Sheets—Sheet 3.



Witnesses:

J. Edwards

R. H. Jayman

Inventor:  
George W. Mackenzie  
by O. W. Clarke  
his Attorney



# UNITED STATES PATENT OFFICE.

GEORGE W. MACKENZIE, OF BEAVER, PENNSYLVANIA.

## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 671,087, dated April 2, 1901.

Application filed February 5, 1900. Serial No. 3,933. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. MACKENZIE, a citizen of the United States, residing at Beaver, in the county of Beaver and State of Pennsylvania, have invented or discovered a new and useful Improvement in Acetylene-Gas Generators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in front elevation of my improved acetylene-gas-manufacturing apparatus, the generator being shown in vertical section. Fig. 2 is a partial sectional view of the generator, illustrating a float adapted to fill the interior space. Fig. 3 is a top plan view. Fig. 4 is a horizontal section indicated by the line IV IV of Fig. 1. Fig. 5 is a partial vertical section through the generator, showing the top partly raised. Fig. 6 is a perspective detail view of a portion of the top of the generator. Fig. 7 is a perspective detail view of portions of the apparatus, showing the means for dropping the cartridges by the falling action of the holder-bell. Fig. 8 is a partial similar view illustrating the action of dropping a cartridge. Fig. 9 is a detail view of the pawl-arm-shifting mechanism. Fig. 10 is a detail plan view of the shifting eye adapted to engage the lever-bracket. Fig. 11 is a detail view, partly in section, of one of the cartridges. Fig. 12 is a perspective detail view of the cartridge-screen.

My invention relates to the class of generators wherein the carbide is submerged in the water in measured quantities, and it relates to the construction of the generator and its parts, as shall be more fully hereinafter set forth.

Referring to the drawings, the entire apparatus consists generally of a generating-department A and a storage and cooling department or holder B, provided with a rising-and-falling bell. The generator is designed to operate in conformity with the consumption of the gas and is automatically governed by the fall of the bell due to exhaustion of its contents.

The generator A is composed of a cylindrical chamber having outer and inner walls 2 3, an intervening water-seal space 4, and an

interior bath-containing and gas-generating chamber 5, closed by a bottom 6.

The entire generator is covered by a circular top 7, provided with a cylindrical downwardly-extending shell 8, adapted to be immersed in the water contained in space 4, and thus forming an effective water seal to prevent escape of gas. A drain-cock 9 is provided to draw off water, sediment, &c., the bottom tapering downward to the valve, the valve being provided with a turning stem and handle 10 11. Mounted centrally in the interior of the generating-chamber is a valve-casing 12, downwardly from which leads the gas-pipe 13 through the bottom of the chamber to a point where one branch 14 leads horizontally over into the cooling and storage compartment, an upwardly-leading branch 15 to a safety-valve 16, and a downwardly-leading branch 17 to a drip-chamber 18. The valve-casing 12 projects upwardly above the water-level, having at the top various openings and ports 19, while at the bottom it is provided with a valve-seat 20, against which is adapted to seat a valve 21, mounted on the lower end of a stem 22. This stem has a bearing in the top of the valve-casing and terminates at the top in a flat disk 23, between which and the top of the casing is located a coiled spring 24, by which the valve is held upward to its seat, closing the gas-passage to pipe 13 and the holder. A surrounding shield 25 projects somewhat above the top of the casing and protects it from any water splashed up by the dropping of the cartridge. Surrounding the upper interior of the gas-producing chamber, regularly spaced on a horizontal circle, are a series of cartridge-supporting forks 26, each provided with an open-ended slot 27, and to the body of each fork is pivoted at 28 a double-swinging discharging-arm 29, adapted to embrace the fork above and below, so as to positively discharge the cartridge from its pendent position in the slotted arm, permitting it to drop into the water-bath. The forks are preferably cast integral with a ring 30, which is secured to the upper inner edge of the inner wall 3, this construction insuring uniformity of level, although it will be understood that each fork may be attached to the wall separately, if desired.



Each swinging arm 29 is provided at its free end with a lengthened vertical terminal 31 to insure engagement, extending into the path of an intermittently-actuated dislodging-arm 5 32, secured to the bottom of a vertical stem 33, having an elongated bearing in a cross-bar 34. This bar is incorporated with the top of the generator and extends across it, projecting outwardly at each side and embracing standards 35, with which it interfits and upon which the bar and top is guided and maintained in a vertical position above the generator when raised. Intermittent partial rotations of the shaft are imparted to it 10 through the movement of a pawl 36, pivoted to the lever 37 and adapted to engage a ratchet-wheel 38, secured to the upper end of stem 33. The arm 37 is journaled on the stem, projects outwardly, having near its 20 end a sliding lever-bracket 39, embracing the arm and provided with a downwardly-projecting pin 40, adapted to be removably placed in engagement with a shifting eye 41, provided with an opening through its middle. 25 This eye is connected at each end to and forms a continuation of a wire cord 42, having a fixed connection at its inner end 43, passing under a vertically-shifting sheave-wheel 44 and over fixed guiding sheave-wheels 30 45 46, between which the shifting eye 41 is located. The outer end of the cord is provided with a counterweight 47, which constantly exerts a tension on the cord and keeps it taut. The sheave-wheel 44 is mounted in 35 a bearing in the lower end of a vertically-reciprocating rod 48, mounted in guides 49, normally held raised by the tension of the cord and adapted to be depressed when the bell of the holder falls by means of a striker 50, secured to the bell in such a position that it will come in contact with the top of the rod when the bell is almost empty and nearly down to the limit of its movement. Upon 40 further travel the rod and sheave will be depressed, drawing back the cord 42, shifting the arm 37, and operating arm 32 to dislodge a cartridge, when gas will be immediately generated and the bell will rise. This operation is repeated until all of the cartridges have 50 been dropped, when the machine must be recharged. In this operation the exhausted cartridges are first removed, the slaked carbide being contained in the bag 51, of muslin or other suitable material, tied at the top, 55 thus not only rendering the carbide immediately subject to water action on contact, but also preventing the dispersion of the contents after slaking.

In Fig. 1 I have indicated a wire screen 52, 60 provided with handles 53, which screen will serve to raise the cartridges to the surface of the water, when they may be easily removed. This screen is shown more fully in Fig. 12. Fresh cartridges are then inserted in the 65 forks, depending by the necks, as shown, the arms 29 first having been reset, when the top is lowered and clamped down tight by means

of pivoted dogs 54, engaging lugs 55 on the vertical framework. The top is suspended when raised by counterweights 56, attached 70 to cords 57, passing over guiding sheave-wheels and connected to the top.

For the purpose of indicating the condition of the apparatus I have provided a figured dial 58, arranged around the stem 33 and provided with a series of numerals corresponding with the number of cartridge-supporting forks, and secured to the stem is an indicating-finger 59, which rotates with the stem and points to a numeral corresponding with that 80 of the cartridge about to be discharged, by which means the apparatus will show at a glance when it is necessary to recharge without the necessity of opening it.

In order to provide for entrance of air to 85 the interior of the generator to facilitate the raising operation, I have provided a vent-hole 60 in the top, upon the under side of which is seated a valve 61 when the top is closed, so as to prevent escape of the gas. This valve 90 is mounted on the lower end of a vertically-sliding stem 62, mounted in a guide 63, adapted to drop by gravity when the top is raised, admitting air, and to be seated upwardly by the action of a spring 64, mounted in a case 95 65, bearing upwardly against a head 66 of a vertically-moving rod 67 and adapted to abut under compression against the lower end of the stem 62, thus seating valve 61. The top when raised leaves the interior of the 100 generator exposed, permitting free access for removal of the exhausted cartridges, which may be taken out intact in the original package, thus obviating the disagreeable cleaning operation incident to many machines of this 105 class. The supporting-forks are also recharged, and it will be noted that by reason of the automatic operation of the valve 21 this entire operation may be carried on at leisure without danger of escape of gas, the 110 interior space of the generator being reduced to a minimum by reason of a filler 68 (shown in Fig. 2) of hollow cylindrical form, adapted to float on the surface of the water and to occupy as much as possible of the space above 115 the water and within the circle of cartridges, thus leaving very little room for any storage of gas in the generator, so that it passes immediately to the storage-tank.

The construction and operation of my invention will be readily understood from the foregoing description, and its advantages will be appreciated by those skilled in the art. 120

The operation of the entire apparatus is very simple and positive while being continuous and entirely independent of any care or attention between the charging operations. 125

All parts of the machine are easily available for examination, cleaning, or repair, all forms of toothed gearing are dispensed with, 130 and none of the mechanism is liable to disarrangement, wear, or complication, being very simple and easily understood by those unfamiliar with mechanical devices, thus ren-



dering it available to all classes in need of apparatus of this character.

Various changes and modifications may be made by the skilled mechanic in the design, proportions, and details of construction without departing from my invention, since I do not desire to be limited to the construction shown, but to include such changes, &c., as lie within the following claims.

10 What I claim is—

1. In acetylene-gas apparatus, the combination of a generating-chamber inclosing a water-bath and provided with means for clamping the top upon the chamber, a series  
15 of radially-arranged equally-spaced cartridge-supporting devices located within the chamber above the water-level adapted to support the cartridges, arms pivoted thereto adapted to discharge the cartridges from the supporting devices by swinging action, and means  
20 operating in the interior of the chamber in conformity with the operation of the holder-bell to actuate the pivotal arms, substantially as set forth.

2. In acetylene-gas apparatus, the combination of a generating-chamber inclosing a water-bath, a series of radially-arranged  
25 equally-spaced cartridge-supporting devices located within the chamber above the water-level adapted to pendently support the cartridges, arms pivoted thereto adapted to discharge the cartridge from the supporting devices by swinging action, and means operat-  
30 ing in the interior of the chamber in conformity with the operation of the holder-bell to actuate the pivotal arms, substantially as set forth.

3. In acetylene-gas apparatus, a generating-chamber inclosing a water-bath, a series  
40 of slotted cartridge-supporting forks circularly arranged in the chamber above the water-level, swinging discharging-arms pivoted thereto, and an intermittently-actuated arm

adapted to engage the discharging-arms successively.

4. In acetylene-gas apparatus, a generating-chamber inclosing a water-bath, a series  
45 of slotted cartridge-supporting forks circularly arranged in the chamber above the water-level, swinging discharging-arms pivoted thereto, a rotating shaft mounted in the top  
50 of the chamber provided with an arm adapted to engage the discharging-arms successively, and means operated by a movable gas-holder to actuate the shaft.

5. In acetylene-gas apparatus, a generating-chamber inclosing a water-bath, a series  
55 of slotted cartridge-supporting forks circularly arranged in the chamber above the water-level, swinging discharging-arms pivoted thereto, a rotating shaft mounted in the top  
60 of the chamber provided with an arm adapted to engage the discharging-arms successively, a ratchet-wheel secured to the shaft, an operating-lever pivoted to the shaft provided  
65 with a pawl, and shifting devices operated by a movable gas-holder to actuate the lever.

6. In an acetylene-gas apparatus, the combination of a generating-chamber provided  
70 with a removable top and a water seal, a gas-valve in the interior of the chamber, a valve-controlled air-vent in the top, cartridge supporting and dislodging devices in the interior of the chamber, an operating-lever above  
75 the top adapted to actuate such dislodging devices, and a shifting cord detachably connected with the lever and in engagement with a sheave-wheel mounted on a rod adapted to  
80 be depressed by the bell of the holder at or near the limit of its downward movement.

In testimony whereof I have hereunto set my hand.

GEORGE W. MACKENZIE.

In presence of—

PETER J. EDWARDS,  
C. M. CLARKE.