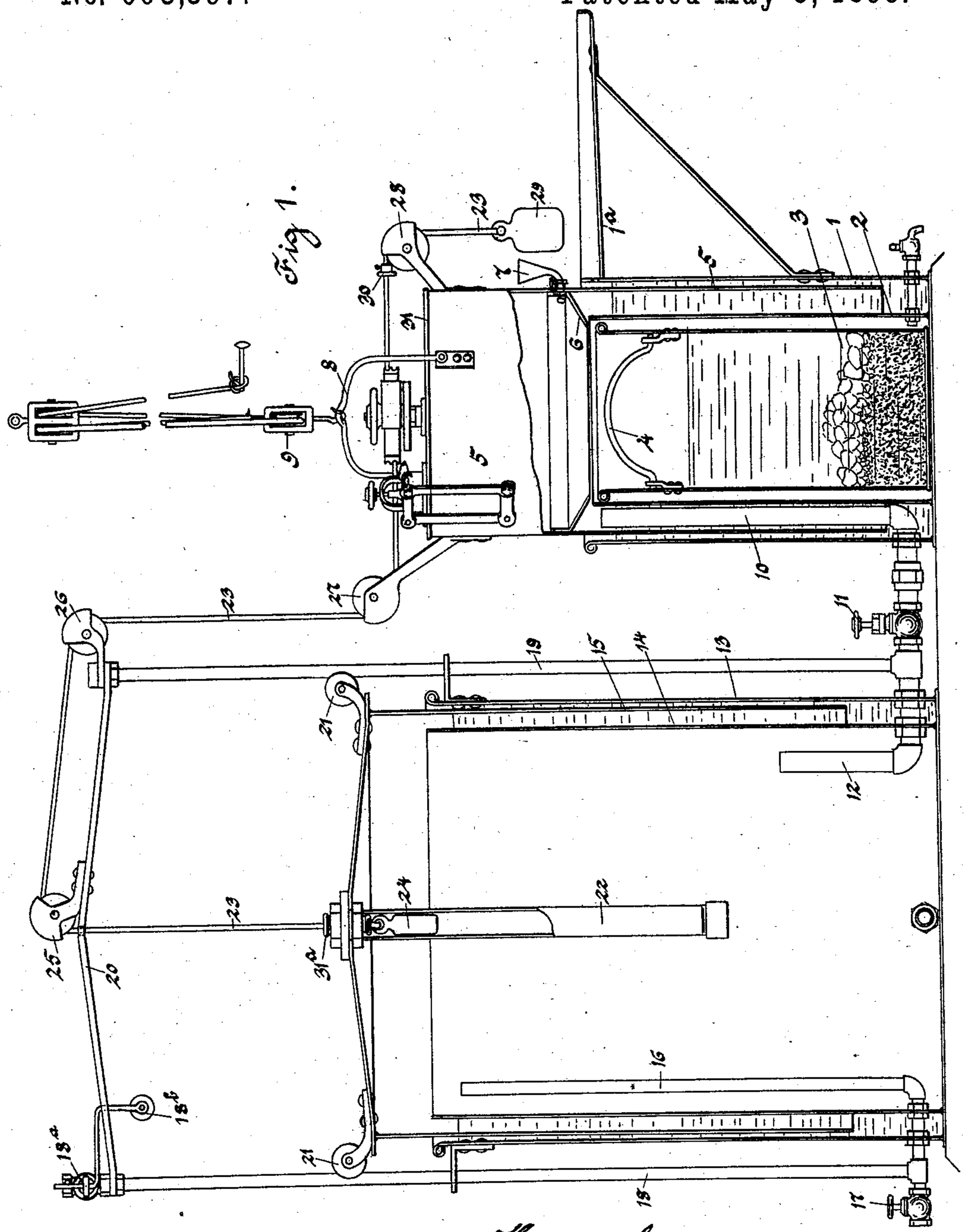
(No Model.) 4 Sheets—Sheet 1.

T. A. BRYAN & J. H. COUPER.

ACETYLENE GAS GENERATOR.

No. 603,397. Patented May 3, 1898.

Fig 1.



WITNESSES

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(No Model.)

4 Sheets—Sheet 2.

T. A. BRYAN & J. H. COUPER.

ACETYLENE GAS GENERATOR.

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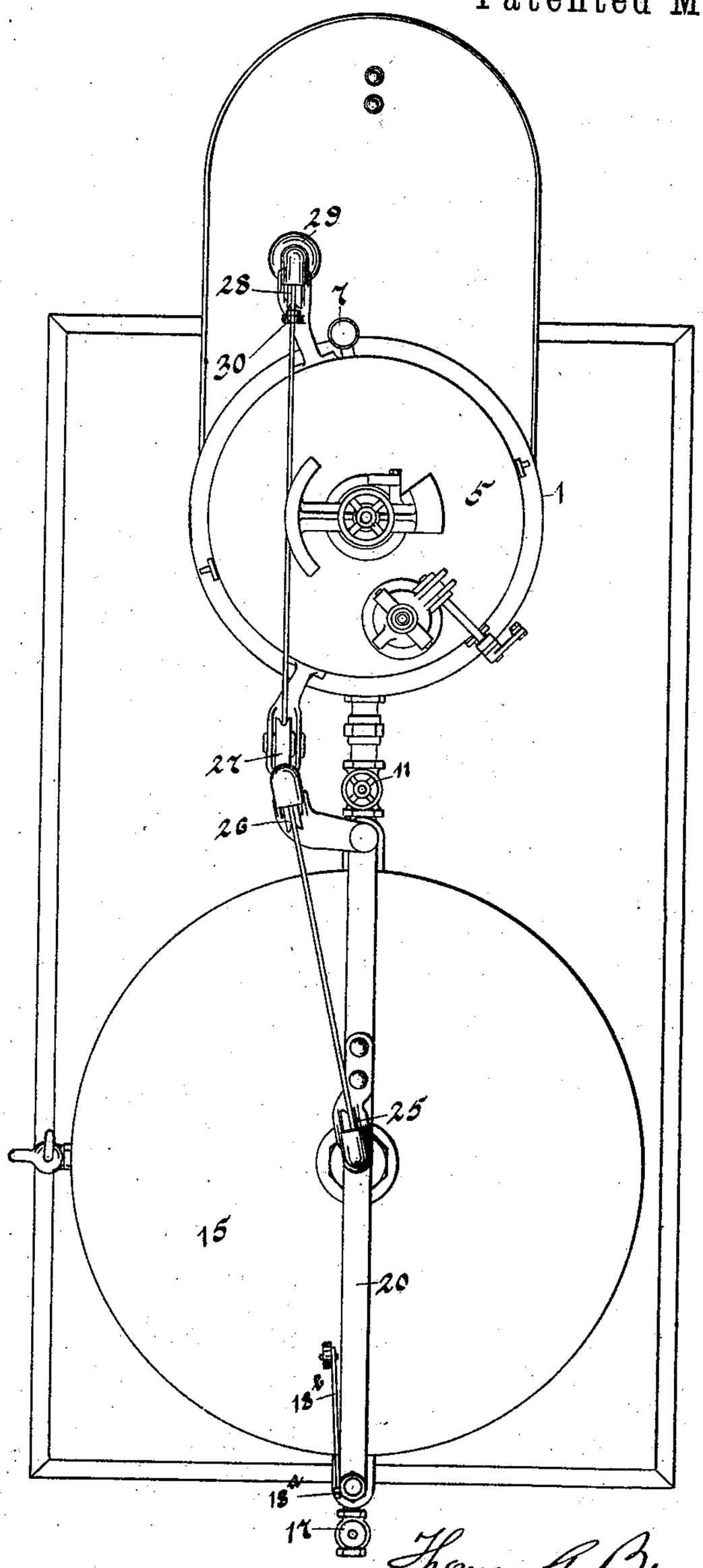

Fig 2.

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ACETYLENE GAS GENERATOR.

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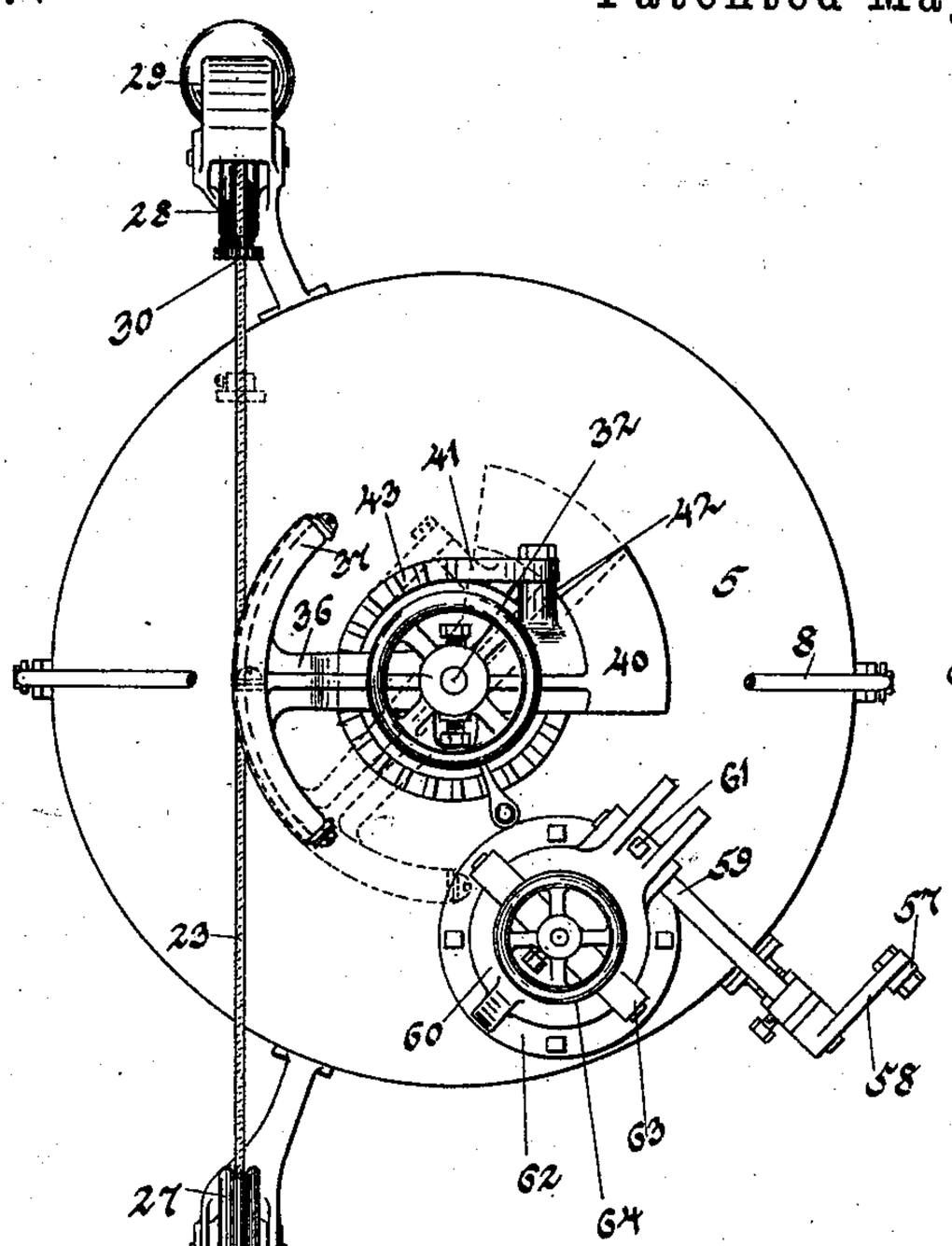
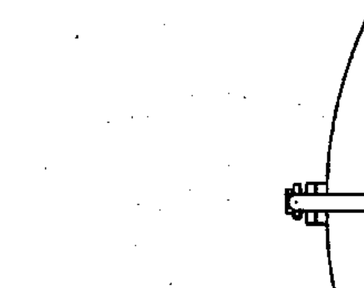


Fig 3.

Fig 5.



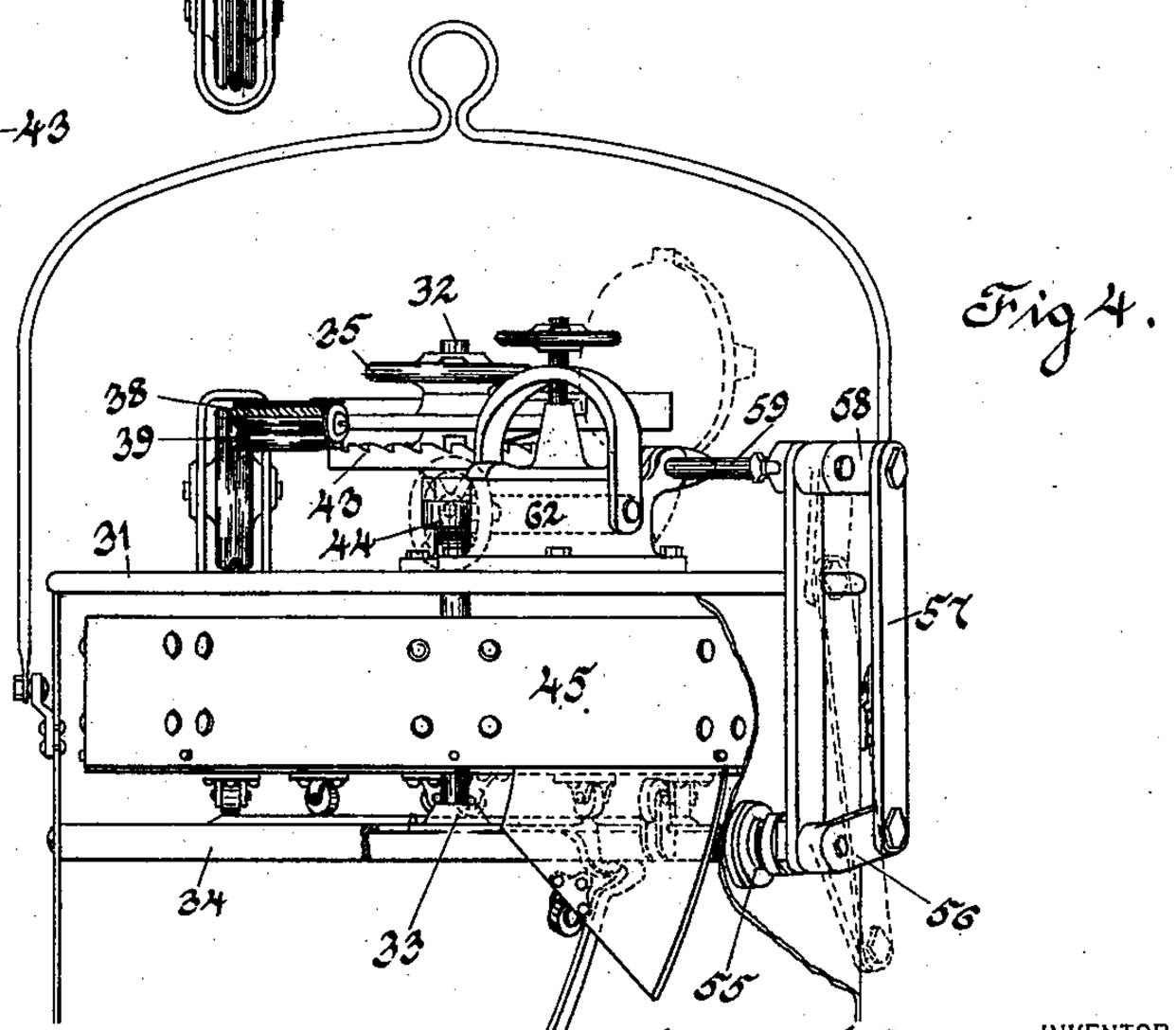


Fig 4.

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(No Model.) 4 Sheets—Sheet 4.

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ACETYLENE GAS GENERATOR.

No. 603,397. Patented May 3, 1898.

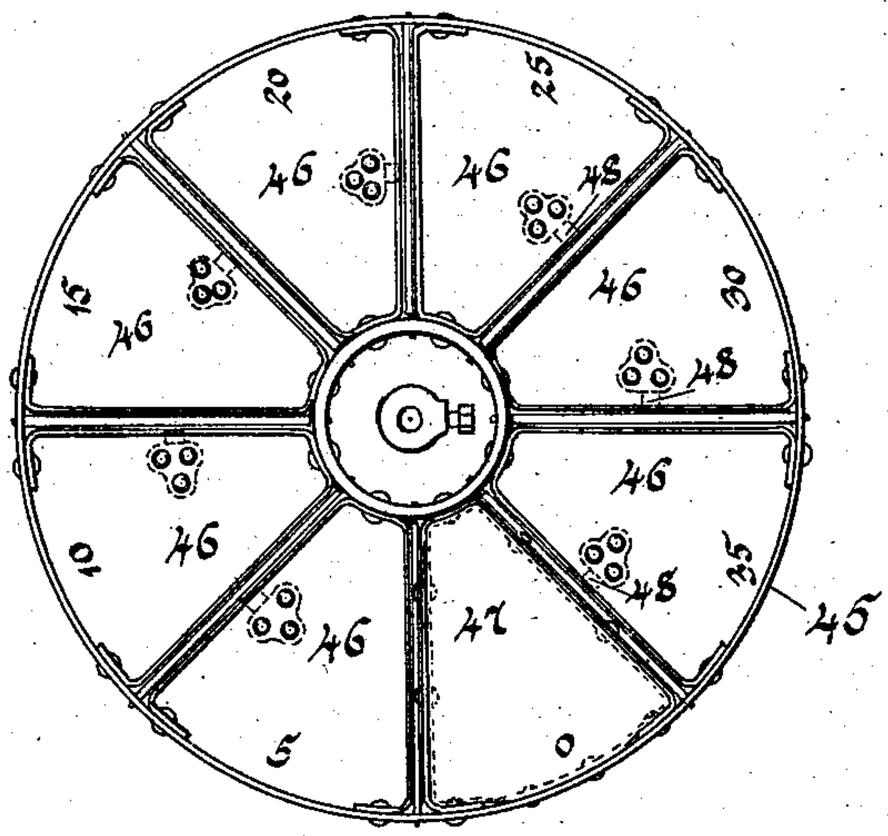

Fig 6.

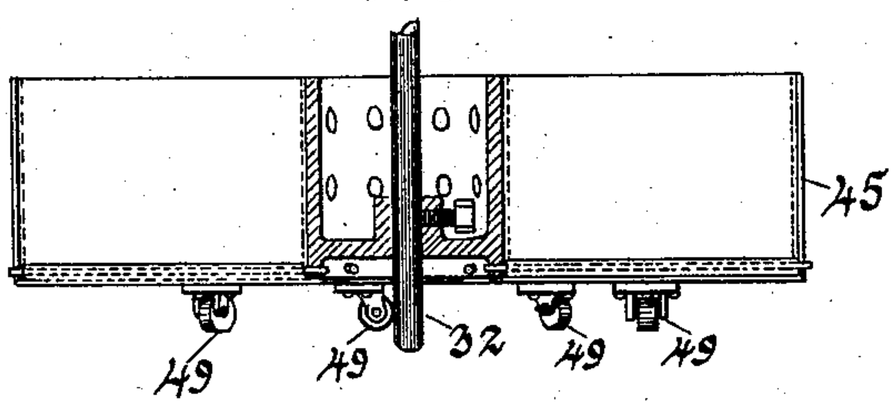

Fig 7.

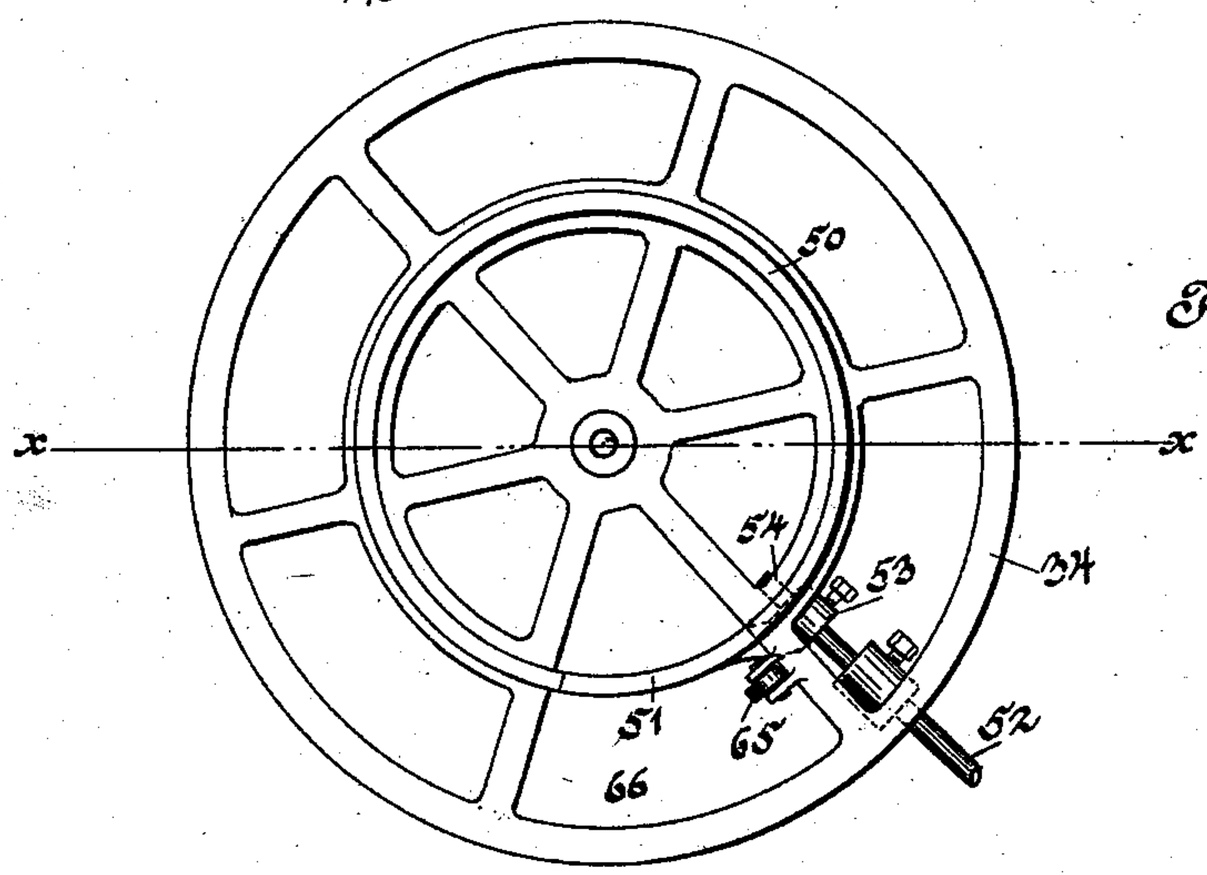

Fig 8.

Fig 9.

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UNITED STATES PATENT OFFICE.

THOMAS A. BRYAN AND JAMES H. COUPER, OF BALTIMORE, MARYLAND.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 603,397, dated May 3, 1898.

Application filed January 6, 1898. Serial No. 665,730. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. BRYAN and JAMES H. COUPER, citizens of the United States of America, and residents of Baltimore city, State of Maryland, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

Our invention relates to a machine for generating acetylene gas by the union of calcium carbid with water, and has for its object the making of a compact, inexpensive, and efficient apparatus which can be practically used by persons without much mechanical skill for the generation of acetylene gas for use in houses.

In the drawings similar numbers represent the same parts in the various figures.

Figure 1 is a side elevation, partly in vertical section, of the generating apparatus and the gasometer. Fig. 2 is a plan of the machine. Fig. 3 is an enlarged plan of the generator. Fig. 4 is a vertical elevation of the generator, a portion of the bell thereof being cut away to show the interior apparatus in full elevation and partly in section. Fig. 5 is a plan of the ratchet, showing the indicator. Fig. 6 is a plan of the carbid-receptacle. Fig. 7 is a vertical section of the same. Fig. 8 is a plan of the grating-support for the carbid-receptacle. Fig. 9 is a vertical section of the same on the line *x x* of Fig. 8.

Referring to the drawings, 1 is the permanent casing or can of the generator. 2 is an interior cylinder secured to the same bottom as the can or casing 1, and the interspace between these two cylinders or cans is watertight to receive oil or water to water-seal the generator.

3 is a water-can provided with a bail 4 and adapted to stand inside of the cylinder 2 and to be filled with water for the purpose of generating gas. It is important in an apparatus of this character that the carbid should be plunged suddenly into the water, and all of the gas capable of being given off by it should be given off immediately. Experiment has demonstrated that this action produces the most satisfactory result.

5 is the bell of the generator, closed at the top and open at the bottom. It is suspended above the cans 1, 2, and 3, inclosing cans 3 and 2 and sliding inside of the can 1 and into the water or oil contained between the cans 1 and 2. In the upper end of this cylinder is arranged the apparatus for delivering carbid to the water for the purpose of generating gas. This apparatus will be described in detail hereinafter, and consists generally of a revolving pan or carrier divided into eight sections, seven of which are charged with carbid, and at proper intervals this carbid is dropped from the said receptacle into the can 3 and into the water for the generation of gas.

6 is a funnel arranged upon the interior of the bell or cylinder 5, secured to its interior surface, and the contracted mouth standing immediately over the can 3, so as to direct and deliver both water and carbid into the can.

7 is a funnel for the reception of water to charge the can 4. The interior end of the pipe connected to the funnel 7 projects into the funnel 6. This pipe in practice will be provided with a stop-cock to close it, and if the machine is placed in a permanent position it will probably be desirable to connect the pipe supplying water to the funnel 6 with a permanent water-supply.

8 is a bail secured to the exterior of the bell or cylinder 5 and adapted to be connected with a suitable hoisting device, such as 9, for the purpose of raising the bell 5 out of the cylinder 1 in order to remove the can 3. This may be done by simply raising the cylinder 5, which is suspended from a suitable crane by means of the block and fall 9, and swinging it off of the can 1. The platform 1^a is provided for the purpose of receiving the bell 5 when it is lifted out of the can 1, and has a flange around its edge and is so connected with the can 1 that whatever water or oil may drain off of the bell 5 will run back into the can 1. When the bell 5 is removed from the can 1, the can 3 may then be removed by the same block and fall by means of the bail 4, emptied, and replaced.

10 is the gas-pipe, the open end of which projects into the gas-space within the bell 5 and above the level of the water or oil in the can 1, and thence proceeds into the gas-space of the gasometer. 11 is a valve in said pipe between the generator and gasometer. 12 is the upturned end of the same pipe, delivering

gas into the gasometer. The gasometer consists of three parts similar to the generator.

13 is an exterior cylinder, 14 an interior cylinder, both stationary, the interspace between them being filled with oil or water.

15 is a bell or cylinder closed at the top and open at the bottom, which enters the interspace between cylinders 13 and 14 and is sealed by the water or oil contained therein.

16 is the gas-escape pipe, which has an exit from the gasometer at the bottom, but which rises nearly to the top and is open at the other end. 17 is a valve in said pipe upon the exterior of the gasometer to control the outflowing gas.

18 and 19 are two support-rods connected to the pipes 10 and 16 on each side of the gasometer and stayed to the upper end of the can 13 and connected together at the top by means of a yoke 20. The guide 19 is only a guide, while the guide 18 serves the additional function of a safety-valve pipe. It is connected at its lower end to the pipe 16, and at the upper end it is provided with a safety-valve 18^a. 18^b is a valve stem and handle for said safety-valve, which projects over the bell of the gasometer and into its path and will be struck by the gasometer when it rises to the upper extremity of its path of motion. Thus if an unusual generation of gas should take place sufficient to rupture the apparatus or to force the fluid out of the gasometer the bell 15 will rise and strike the valve-handle 18^b, open the valve, and permit the gas to escape.

21 21 are guide-rollers secured in brackets upon the top of the bell of the gasometer and traveling upon the guide-rods 18 and 19.

22 is a pipe secured into the top of the bell 15 and dropping therefrom down into the bell and closed at the bottom. This pipe is shown in the drawings partly full and partly in section and serves as a pocket and guide for the weight 24.

23 is a cord which passes through the eyelet 31^a in the center of the top of the bell 15 and to the extremity of which is secured the weight 24, which slides up and down in the pipe 22 as the bell rises and falls.

25, 26, 27, and 28 are pulleys over which the rope 23 passes, and 29 is another weight, heavier than 24, secured to the other extremity of the rope 23.

30 is a stop secured upon the rope 23 at a desired point and serving to hold the rope in a stationary position against the pull of the weight 29, which is heavier than the weight 24.

The pulley 25 is mounted in a bracket upon the top and center of the yoke 20. The pulley 26 is mounted in a bracket upon the top of the guide-rod 19. The pulley 27 is mounted upon a bracket secured to the side of the bell 5, and the pulley 28 is similarly mounted in a bracket upon the opposite side of the bell 5.

Referring now to Figs. 3 and 4, 32 is a vertical shaft which passes through the center of the top 31 of the bell 5 and through the stuffing-box 44 therein for the purpose of maintaining a gas-tight joint at that point.

34 is a grating-partition which is secured to the interior walls of the bell 5 and is provided with suitable openings for the purposes which will be hereinafter described. In the center of this grating is a step 33, into which the foot of the shaft 32 fits and upon which it rests.

35 is a hand-wheel secured to the upper end of the shaft. 36 is a lever or arm journaled upon said shaft and provided on its extremity with an arc 37, the exterior surface of which has two grooves 38 and 39. The rope 23 is divided and one end of it lies in one of said grooves and is secured to one end of said arc, while the other end lies in the other groove and is secured to the other end of said arc. This arrangement permits the lever 36 to be turned by the rope 23 while at the same time maintaining the rope always tangent to the arc 37. On the opposite side of the shaft 32 from the lever 36 is a counterbalance-weight 40, and upon the side of this counterbalance-weight is secured a pawl 41, pivoted upon a boss 42.

43 is a ratchet-wheel secured to the shaft 32 immediately below the lever 36 and which is engaged by the pawl 41, so as to be turned by it. A plan view of this ratchet-wheel is shown in Fig. 5, and numbers are placed upon the surface of the wheel, so as to indicate arbitrarily the position of the buckets or boxes within the bell 5 when the apparatus is closed.

43^a is a pointer, mounted upon the top 31, which coöperates with the numbers above referred to for the purpose specified.

45 is the pan or carbid-carrier. It is shown in Figs. 4, 6, and 7 and consists of a circular shallow pan divided into eight compartments by radial partitions. The divisions of the carrier are marked 46 46 46, &c., and 47. Each of the compartments 46 46 is provided with a bottom, which is hinged to the radial partition at one side and provided on its exterior with a roller 49 upon the opposite edge. The section 47 is permanently closed. The carrier 45 is secured to the shaft 32 by means of a set-screw passing through a boss surrounding the shaft, and the carrier is revolved by means of the shaft. The grating 34 lies immediately below the carrier 45 and is provided with a circular track 50 immediately below the rollers 49, which rests upon it. The track 50 has one removable section 51 in the space 66, which is capable of being raised or lowered into or out of position by the action of a lever mechanism. When raised, the track 50 is continuous. When lowered, a section of the track will be vacant. The section 51 is secured to a rock-shaft 52 by means of a collar and set-screw 53. The rock-shaft 52 is journaled in a hole 54, drilled in one of the flanges of the grating 34, and in a stuffing-box 55, located in the side wall of the bell 5, through which it passes and by which a gas-tight joint is made. Upon the extremity of the rock-shaft 52 is secured a lever 56, to the extremity

of which is fastened a pitman-rod 57, the other end of which is secured to a lever 58, fastened upon the rock-shaft 59. Said rock-shaft forms the pin of the hinge of the cover 60 of the carbid-inlet or charging-hole 62. The cover 60 is rigidly secured to the shaft 59 by means of the set-screw 61 and is adapted when raised to rock the shaft 59, turn the levers 58 and 56 by the pitman 57, turn the rock-shaft 52, and raise the section of track 51 into position, so as to make the track 50 continuous.

62 is the charging-hole, through which the boxes or sections of the carrier 45 are charged with carbid. It consists of a cylinder bolted to the top 31 of the bell 5 and having the cover 60 fitted thereto and provided with a gasket to make a gas-tight joint.

63 is a yoke pivoted to the sides of the cylinder 62 and provided with a screw and hand-wheel 64, the screw threaded into the center of the yoke, by which pressure may be applied to the top of the cover 60 to force it down upon the gasket and make a gas-tight joint.

The operation of the device is as follows: The can 3 is first filled with water to the desired level, the cover 60 removed from the charging-hole 62, the pan 45 turned around by means of the hand-wheel 35, the pawl 41 having been raised out of engagement with the ratchet 43 until the first box 46, which on the dial-plate upon the ratchet registers "5," stands under the charging-hole 62. The raising of the cover 60 has meanwhile restored the movable section 51 and made the track 50 continuous. A suitable quantity of carbid is then charged into the box 46, and the remaining boxes numbered 46 are each in succession charged with a suitable quantity of carbid. When the last box 47, which is a dummy—that is to say, a box which is inoperative and has a solid bottom—comes under the charging-hole, the cover 60 may be lowered and secured in place. The lowering of the cover 60 drops the movable section 51 of the track 50, and if the box 47 had a hinged bottom carbid would be thus dumped into the water and gas generated before the cover 60 could be securely fastened into place, and an escape and waste of gas would result. For this reason the section 47 is not used for the purpose of charging carbid to the apparatus. The cover 60 may then be securely fastened into place and the hand-wheel turned, rotating the carbid-carrier and the ratchet-wheel from the position indicated by "0" opposite the pointer to the position indicated by "5" opposite the pointer. In this position, the section of track 51 being down and the space 66 being open, the bottom of the first box 46 will fall and dump its contents of carbid into the water. The pawl may then be placed in engagement with the ratchet, gas will be generated, and the gasometer filled until the bell 15 rises to the top of its path of motion. If too much gas is generated, the bell 15 will strike the safety-valve handle and allow some of it to escape. As the gas is consumed the bell 15 will descend, and when it reaches the position shown in Fig. 1 of the drawings, near the bottom of its path of motion, the eyelet 31^a will strike upon the top of the weight 24 and draw the weight and the cord 23 down against the pull of the counterbalance-weight 29. In doing so the lever 36 will be turned by the action of the rope 23, secured to its arcs, and the ratchet-wheel 43 will be moved by the pawl 41, and the carbid-carrier 45 will be turned by the same action through a distance sufficient to cause another section of it—that is to say, another box—to be brought over the opening 66 in the grating 34, when the bottom of that section will fall, and a fresh charge of carbid will be delivered to the water. The weight 24 is of course so located upon the rope 23 in relation to the position of the bell 15 that as the bell 15 descends a sufficient motion will be given to the rope 23 to turn the carbid-receptacle one-eighth of a revolution, and thereby bring another box over the open space 66 in the grating 34. This is all arranged by the adjustment of the stop 30 and the weight 29. When the gas is generated and the bell 15 rises, the weight 29 will draw the weight 24 up and cause the lever 36 to turn; but the pawl 41 will slip over the ratchet 43 and not move it until it assumes a new position ready to move the carbid-receptacle again. It will thus be seen that by this apparatus the carbid is subdivided into seven different portions, each held distinctly independent and delivered into the water in suitable quantities by a sudden plunge as it is needed and automatically.

It will be readily observed by a mechanic skilled in the art of making apparatus like that herein described that the generating device might be mounted upon the top of the gasometer and the water-can for the reception of the carbid placed within the gasometer. It would then only be a matter of mechanical adjustment to arrange the cord 23, so as to be operated by the rise and fall of the bell 15, to produce a result identical with that accomplished by our mechanism.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an acetylene-gas generator the combination, of a water-tank and carbid-receptacle with a gasometer; the carbid-receptacle having means through which it may be charged or filled and being divided into compartments, all except one, which is permanetly closed, having hinged bottoms which rest upon a support provided with an open section so located as to permit the hinged bottoms of the compartments to fall and dump their contents into the tank as they pass over it, means for closing this open section in the support so arranged and connected with the means for charging or filling the carbid-receptacle that when the means for charging or filling the carbid-receptacle is open or active the open-

ing in the support below the carrier will be closed, and vice versa, substantially as shown.

2. In an acetylene-gas generator the combination, of a water-tank and a carbid-receptacle, with a gasometer, the carbid-receptacle consisting of a carrier divided into compartments, each having a hinged bottom, except one which is solid, said bottoms being provided with rollers, a permanent support below the carrier provided with a track upon which the rollers of the bottoms rest, and by which they are supported, the support and track having a movable section which, when open will permit the bottom of one of the said compartments to fall as it passes over said section and dump its contents of carbid into the water, the charging-hole in the top of the gasometer for charging carbid into the receptacle provided with a cover, means for connecting the cover with the movable section of track of the support adapted to maintain the movable section of track in place and support the bottoms of all of the compartments when the cover of the charging-hole is open and to drop the section of track and leave the open section for dumping when the cover of the charging-hole is closed, substantially as described.

3. In an acetylene-gas generator the combination, of a water-tank and a carbid-receptacle, with a gasometer, the carbid-receptacle consisting of a carrier, divided into compartments, each having a hinged bottom, except one, a permanent support below said carrier supporting said bottoms, said support being provided with an open section adapted to permit the bottom of one of said compartments to fall as it passes over it and thus dump its contents into the water, the carrier being mounted upon a rotating shaft which passes through the generator and is provided upon its exterior with a ratchet and lever, the ratchet being rigidly secured and the lever journaled upon the shaft and carrying a pawl which engages and operates the ratchet, said lever being connected at its extremity to a cord which passes over a series of pulleys, and each end of which is provided with a weight, one being heavier than the other, a stop upon the cord to limit its motion under the influence of the heavier weight and means connecting the other end of the cord with the bell of the gasometer whereby as the said bell descends it will pull the cord and operate it and the lever and carrier against the pull of the heavier weight.

4. In an acetylene-gas generator the combination of a gasometer, having an opening through which the carbid for charging the generator is supplied, said opening having a removable cap, a carbid-carrier contained within the gasometer, and a support under the carrier, said support having a movable section connected to the cap in such a way that the act of opening the cap closes the movable section of the support, and the act of closing the cap opens the movable section of the support.

5. In an acetylene-gas generator, the combination of a gasometer having an opening in the top through which the carbid for charging the generator is supplied, said opening having a removable cap, a carbid-carrier contained within the gasometer, said carrier being divided into a number of compartments having hinged bottoms except one which is permanently closed, rollers attached to the bottoms, and a support under the carrier having a track upon which the rollers rest, a section of the track being hinged and connected by a system of levers to the removable cap on the top of the gasometer, so that the act of removing the cap closes the track, and the act of closing the cap opens the track, all arranged and constructed substantially as and for the purposes set forth.

Signed by us at Baltimore, Maryland, this 3d day of January, 1898.

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