

No. 637,633.

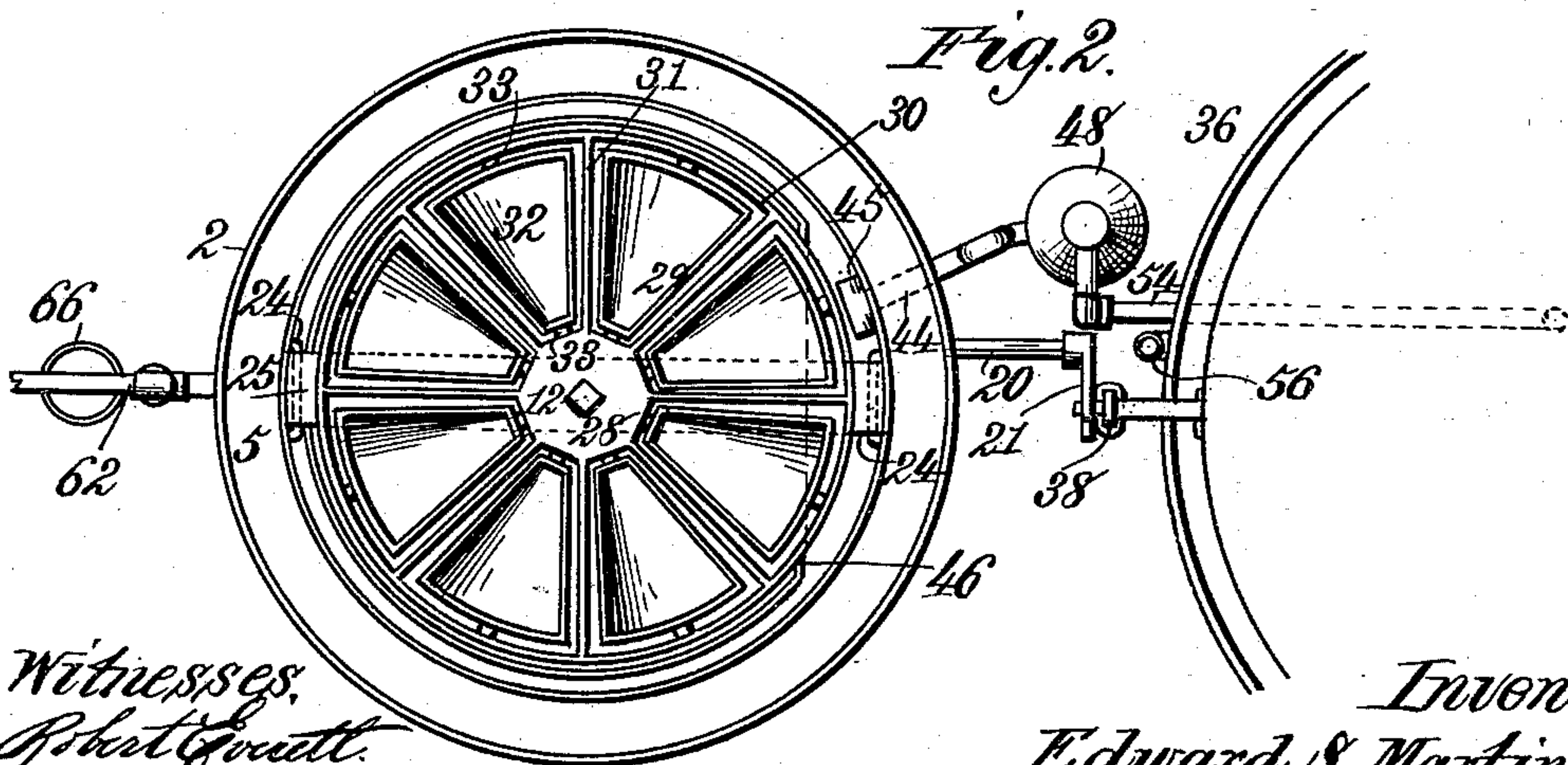
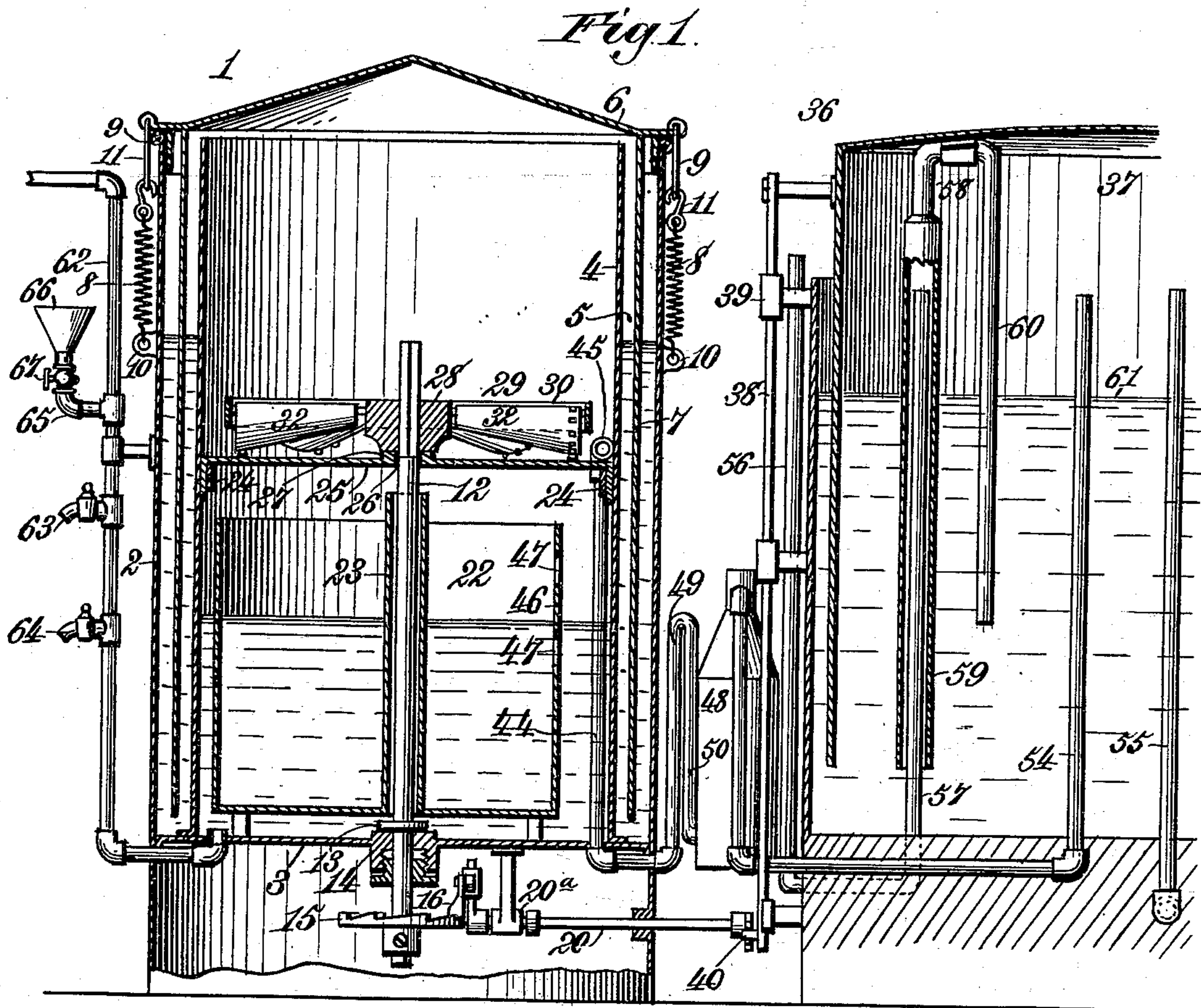
Patented Nov. 21, 1899.

E. S. MARTINDALE.  
ACETYLENE GAS GENERATOR.

(Application filed Dec. 9, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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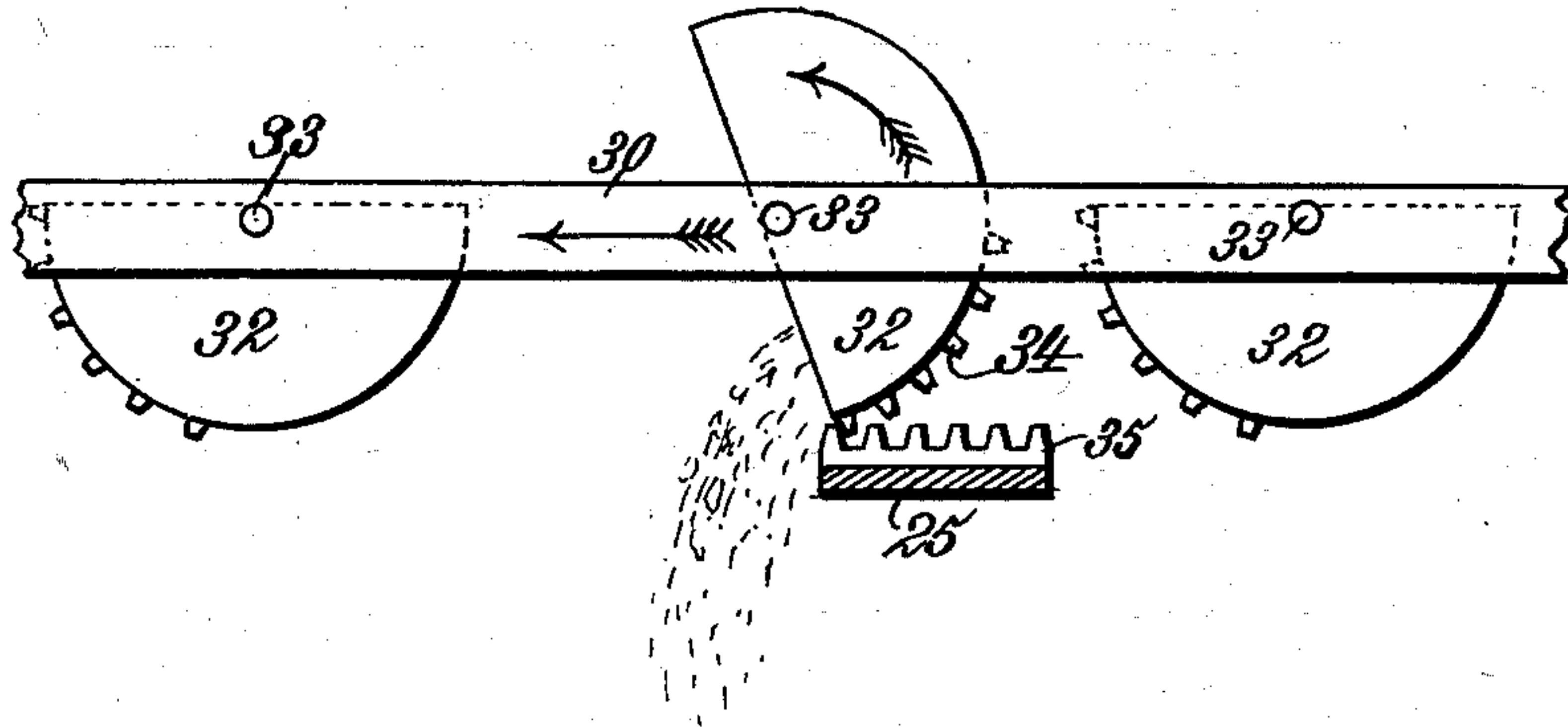
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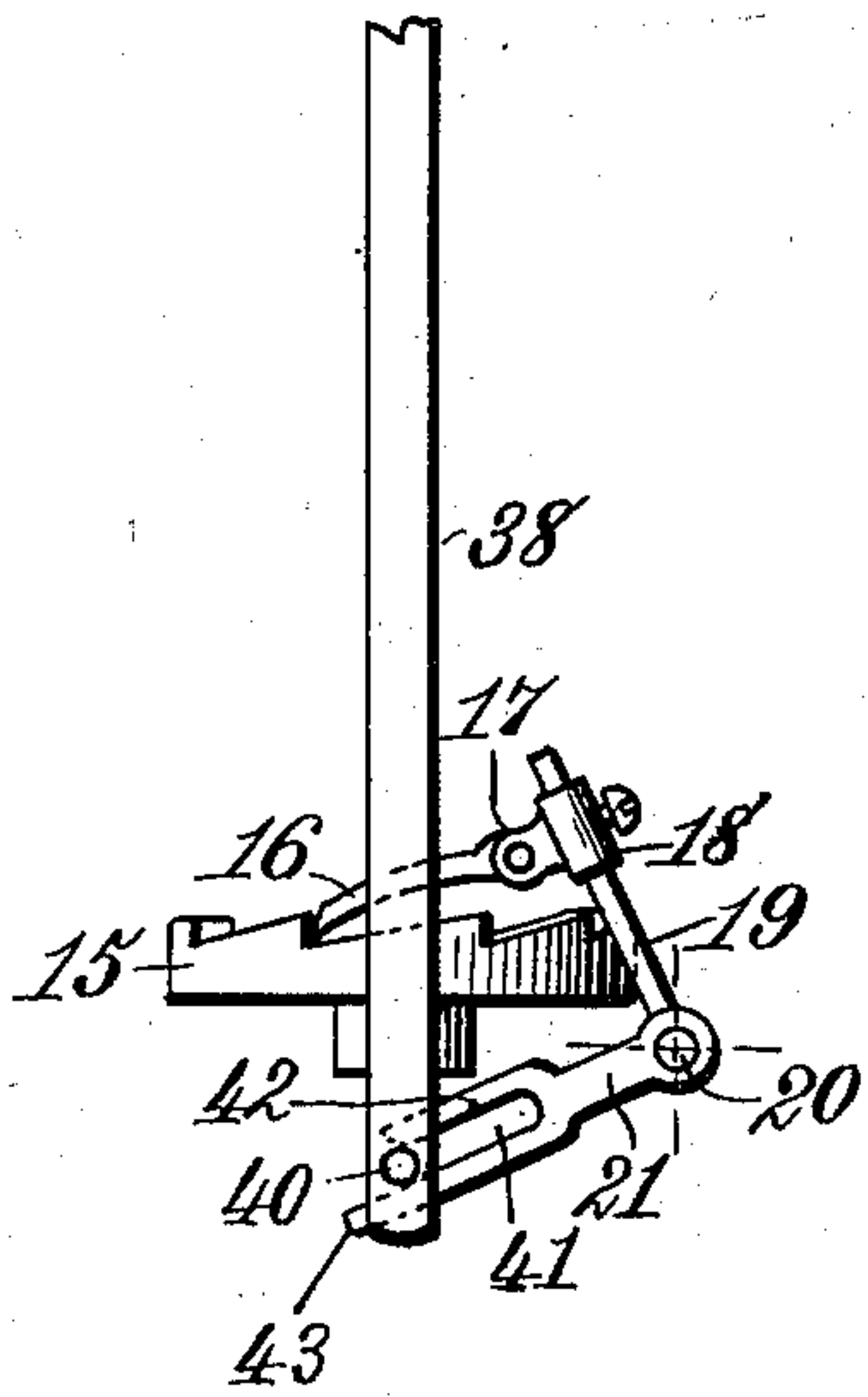
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2 Sheets—Sheet 2.

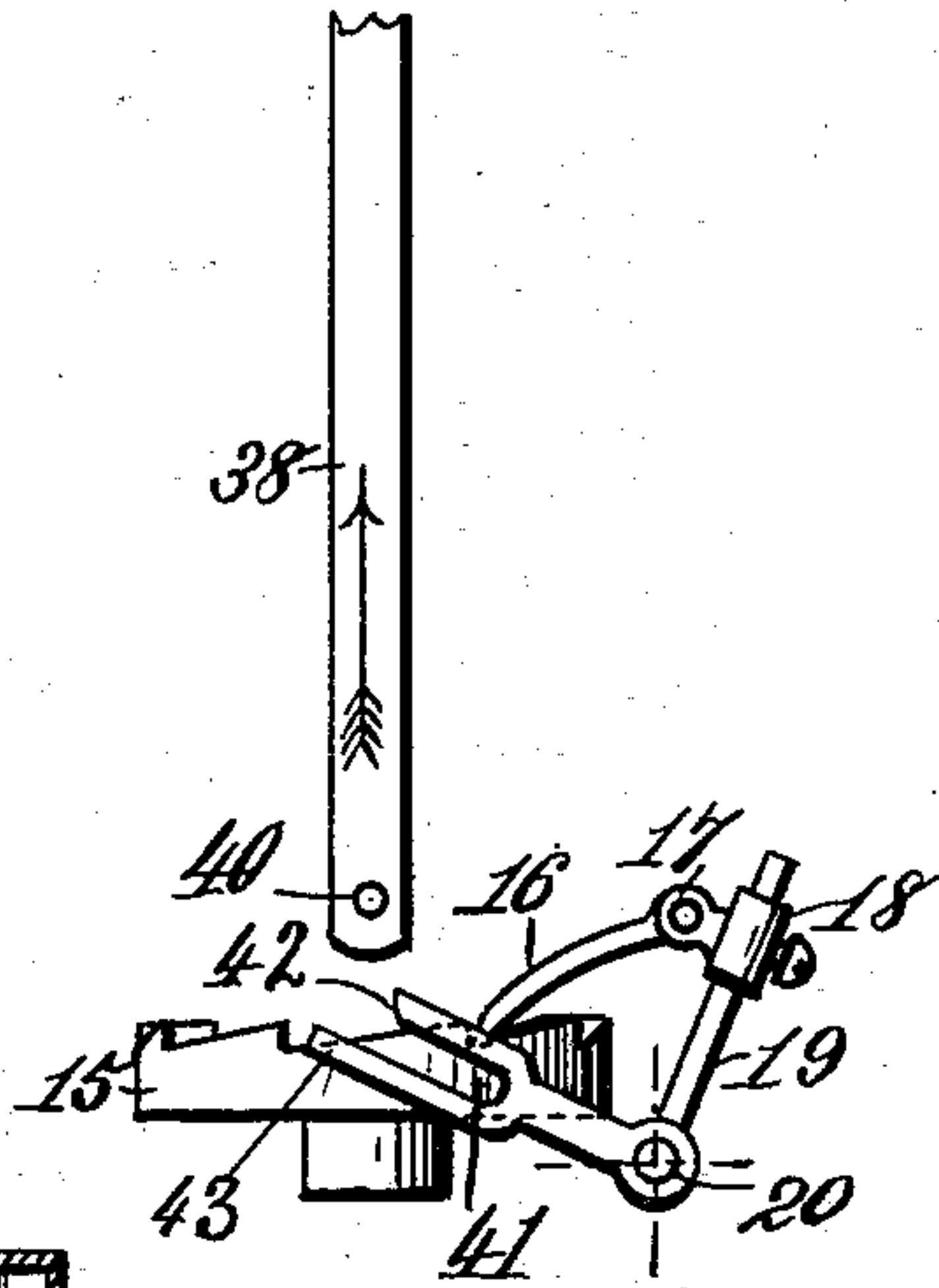
*Fig. 3.*



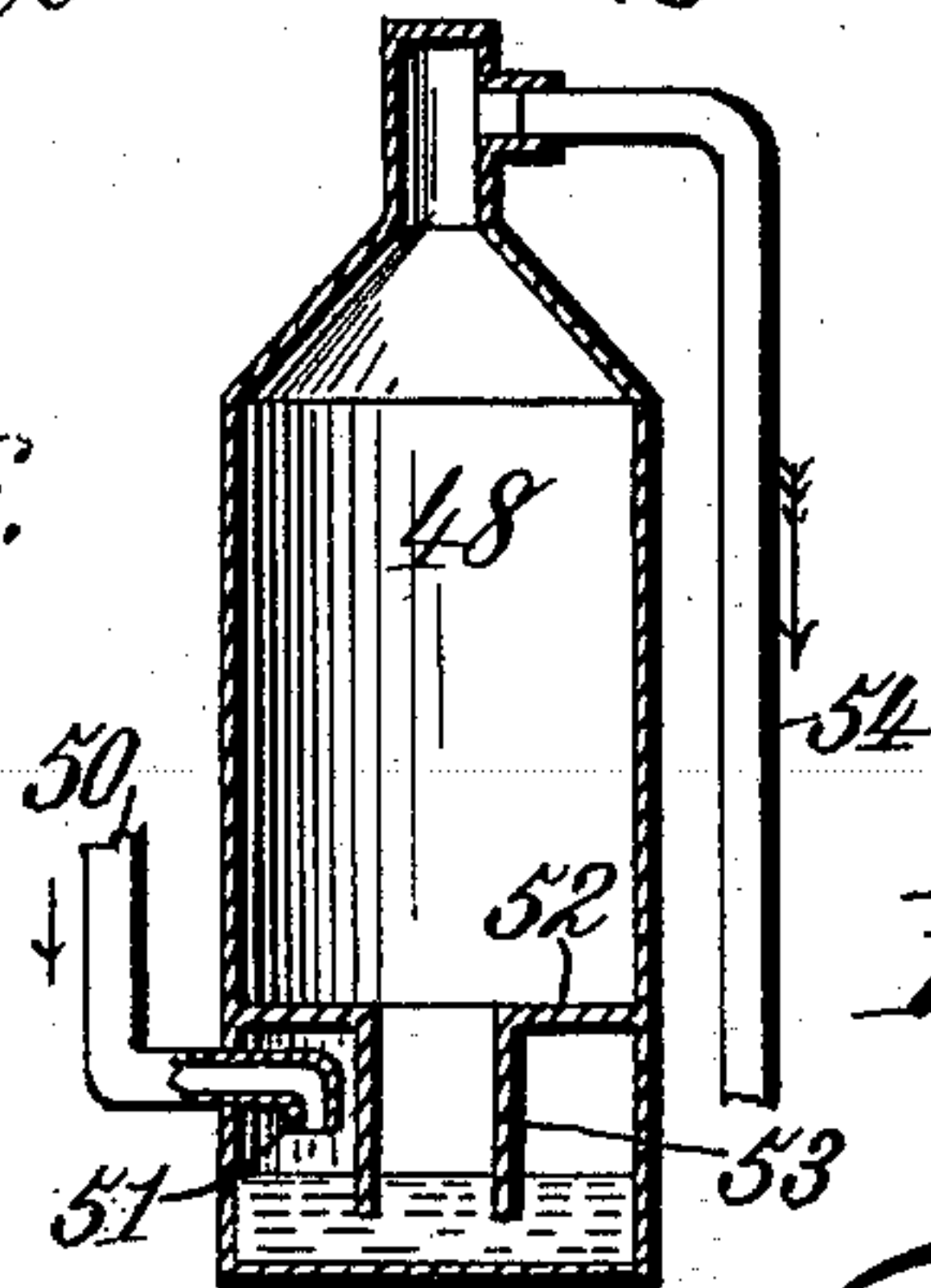
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

EDWARD S. MARTINDALE, OF WARREN, PENNSYLVANIA, ASSIGNOR TO THE  
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## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 637,633, dated November 21, 1899.

Application filed December 9, 1898. Serial No. 698,759. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD S. MARTINDALE, a citizen of the United States, residing at Warren, in the county of Warren and State of Pennsylvania, have invented new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

My invention relates to improvements in acetylene-gas generators, and has reference to improvements in that class of apparatus designed to generate gas by what is known as the "wet" process, wherein the carbid is dropped into a body of water, as distinguished from the "dry" process, in which water is dropped upon or otherwise permitted to contact with a body of carbid.

It is an object of my invention to provide improved means for dropping the carbid into the water.

A further object of the invention relates to improved mechanism for causing a series of carbid-containers to discharge their contents at desired intervals and operated automatically by the action of a holder for the gas generated, whereby the generation of the gas will be controlled by the amount of gas consumed.

A further object of the invention relates to an improved safety device for the generator.

A further object of the invention is to provide an improved safety device for the gas-holder.

A further object of the invention is to provide an improved liquid seal, operating as a check-valve between the generator and the gas-holder.

Still further objects of the invention relate to certain details of construction and operation of parts, all of which will more clearly hereinafter appear.

In the accompanying drawings, Figure 1 is a sectional elevation of a generator and a portion of a gas-holder. Fig. 2 is a top plan view of the same. Figs. 3, 4, 5, and 6 are detail views, on an enlarged scale, of certain of the parts.

The reference-numeral 1 indicates the generator proper, comprising a cylindrical metal casing 2, having a bottom 3, located above the bottom edge of the casing 2, as shown. Secured to the bottom 3 and extending upward

therefrom to the height of the casing is a metal cylinder 4 of a diameter to leave an annular space 5 between its wall and the wall of the casing.

The numeral 6 indicates the cover of the generator, and 7 a cylindrical extension secured thereto and designed to pass down in the annular space 5, so that when water is supplied to said annular space a liquid seal will be afforded. The lid 6 is held to the casing 2 by means of the springs 8. I have shown opposite edges of the cover provided, respectively, with bails 9, and on opposite sides of the casing 2 are secured lugs 10, the lower end of each spring 8 being secured in one of said lugs and its upper end having a hook 11 for engaging in a bail 9. When the carbid is dropped in the water, as presently described, the generation of gas is so rapid as practically to amount to an explosion, and by the provision of the springs 8 the cover 6 is permitted to rise slightly under sudden generation of gas, and thus operates to lessen the jar and strain to the generator.

The construction and operation of the parts for supplying carbid to the generator will now be described.

Extending vertically upward through the bottom 3 of the generator is a rod 12, having thereon a disk 13, resting on the bottom 3 and revolving in a suitable stuffing-box 14 on the under side of said bottom. On the bottom of this rod 12 is secured a horizontally-disposed ratchet-wheel 15, which is operated by means of a dog 16, pivotally secured to a boss 17, carried by a sleeve 18. Said sleeve 18 is adjustably mounted on an arm 19 of a crank-rod 20, which crank-rod is journaled in suitable bearings 20<sup>a</sup>, as shown, and extends through the casing to the outside thereof, and on its outer end is provided with a lever-arm 21, the construction and operation of which will be presently described.

The numeral 22 indicates the receptacle for receiving the charges of carbid, which receptacle has its bottom apertured and provided with an upright tube 23, which is adapted to slide over the rod 12.

On inner opposite sides of the cylinder 4 are provided lugs or cleats 24, which are suit-



ably shaped to receive the bent ends of a flat bar 25. Said bar is provided with a central aperture 26 to receive the rod 12, and said aperture has its edges thickened to provide a bearing 27, upon which rests the lower end of a sleeve 28 of the carbide-holder 29. Said holder comprises a circular frame 30, which is connected to the sleeve 28 by means of brace-bars 31. Located in the space afforded between each pair of brace-bars 31 is a bucket 32, having at opposite ends, near the top thereof, pivots 33, which have bearings respectively in the sleeve 28 and circular frame 30. Said buckets conform generally to the shape of the recess in which they are located, as shown, and are in the form of the half of a frustum of a cone, this configuration of the buckets permitting them to turn freely on their pivots without contacting with each other or with the partitions 31, as will be understood. The sleeve 28 is splined on the rod 12 to move therewith. On one side of each bucket 32 and extending from the bottom to near the top thereof are located and secured a series of teeth 34, which are designed to engage with the teeth of a rack 35, provided on the upper side of the bar 25. As the rod 12 is turned, as presently described, the sleeve 28, and consequently the frame 30, are caused to revolve with it, and as the buckets are thus carried around the successive engagement of the teeth on each with the rack 35 will cause the buckets to be successively turned or dumped to discharge their charge of carbide into the can or receptacle 22 in the manner indicated in Fig. 3. The means for revolving the rod 12 will now be described.

The numeral 36 indicates a gas-holder of the usual construction, the bell 37 of which has secured to it in any suitable manner the upper end of a rod 38, which works in guides 39, provided on the holder. At its lower end said rod is provided with a pin 40. The lever-arm 21 is bifurcated to afford a slot 41, adapted to receive the pin 40 and upper and lower arms 42 43, the upper arm 42 being shorter than the lower arm 43. As the gas is consumed the bell 37 lowers and the pin 40 engages the lower arm 43 and moves the lever-arm 21 downward, thereby causing the dog 16 to engage the teeth of the ratchet-wheel 15 and turn said ratchet-wheel and with it the rod 12, the pin 40 riding up in slot 41. As the rod 12 revolves the carbide-container is caused to turn with it, and a bucket 32 has its teeth 34 brought in contact with the rack 35 and is caused to discharge its contents, as previously described. This sets up a fresh generation of gas, and as this is conveyed to the holder the bell 37 will rise. The relative positions of the lever, pin, and ratchet mechanisms before the bell starts to rise is shown in Fig. 4. As the bell rises the pin 40 engages the under side of the arm 42 and raises the lever-arm 21, thereby causing the dog 16 to ride over the teeth of ratchet-wheel 15.

The pin 40 now leaves arm 42 and is carried upward with the rod 38 as the latter continues to rise with the bell. When the bell again descends a sufficient distance, the above operation is repeated. By the construction described it will be seen that the bell is permitted to move a considerable distance in either direction without operating the ratchet mechanism.

The pipe for conveying the gas from the generator to the holder is indicated by the numeral 44, said pipe entering through the bottom of the generator and extending upward therein to a suitable height and being preferably provided at its upper end with a T 45, affording two lateral openings. The pipe 44 is located on the side of the generator opposite that on which the buckets 32 are caused to discharge their contents. In order to provide proper space for this pipe, the can 22 has a flattened side 46, (shown in dotted lines in Fig. 2,) and in this side are provided at different heights apertures 47 for the free admission of water into said can.

The numeral 48 indicates my improved liquid-seal chamber. (Shown in section in Fig. 6.) The pipe 44, without the generator, is extended upward, as shown at 49, and then downward, as shown at 50, and enters the chamber 48 near the bottom thereof, and within said chamber is provided with a downward extension 51. The sealing device comprises a circular plate or disk 52, secured to the side wall of the chamber 48 and having a central aperture, and at said aperture being provided with an integral downward depending tubular extension 53, the lower end of which does not quite reach to the bottom of the chamber. The open end 51 of tube 50 is located in the annular space afforded between the tube 53 and the side wall of the chamber 48.

The numeral 54 indicates a pipe leading from the top of the chamber 48 and extending upward in the gas-holder, as usual, for conveying the gas thereto. The water in chamber 48 covers the lower end of tube 53, but is normally below the opening in the extension 51. Gas entering chamber 48 through said pipe 50 will drive the water out of the outer space into tube 53 until the water is on a level with the lower end of the tube, when the gas will bubble up through the water in said tube 53 into the upper portion of chamber 48, from whence it is carried by the pipe 54 to the gas-holder. Back pressure in the chamber 48 from the generator, however, will cause the water in the annular space surrounding tube 53 to rise and cover the opening in the end 51 of pipe 50, and thus prevent the gas passing back into the generator.

The numeral 55 indicates the service-pipe leading from the gas-holder.

My improved safety device for the gas-holder is constructed as follows: A pipe 56, communicating with the outer air, has an upward ex-



tension 57 within the gas-holder, with its open end located at a suitable height above the water-level therein. Secured to the bell of the gas-holder is a U-shaped pipe 58, having an enlarged portion or sleeve 59, fitting over and adapted to slide freely on the pipe 57, and a downward extension 60, passing down into the water in the holder, but being shorter than the sleeve portion 59. The numeral 61 indicates the water-level. As the bell 37 rises the pipe 58 is carried upward with it until the lower end of pipe 60 reaches the water-level, when the gas-holder will have received all the gas it is adapted to contain. If more gas enters the holder, the pipe 60 will be lifted out of the water, when the gas will enter said pipe 60 and escape through the pipe 57 to the outer air.

Referring to Fig. 1, I have there shown an improved safety device applied to the generator. This device comprises a vertically-extending pipe 62, which communicates with the cylinder 4 through the bottom thereof and having its outer end at a suitable height and distance from the generator communicating with the outer air. At suitable points on the pipe 62 are provided two cocks 63 64, respectively, for ascertaining the height of water in the generating-chamber. A branch pipe 65 communicates with the pipe 62 and is provided with a funnel 66, whereby water may be supplied to the generator. A valve 67 is located in the branch pipe 65 for closing the same after water has been supplied to the generator. By this construction any excess of pressure in the generator beyond a given amount will operate to blow the water out of the cylinder 4 through the pipe 62 and permit the gas to escape through said pipe. It will thus be seen that my device provides for the automatic control of the generation of the gas, that such generation will be in direct ratio to the consumption, and the safe operation of the apparatus is insured.

Various changes in the shape, location, and arrangement of the parts described herein might be made without departing from the principle of my invention as set forth in the claims.

Having thus fully described my invention, what I claim as new is—

1. In an acetylene-gas generator, the combination with a receptacle for water, of a carbid-container located above the same comprising a revoluble frame carrying a series of pivoted buckets, a rack located below said container and a series of teeth located on each of said buckets and adapted in the revolution of said container to engage said rack whereby to successively upset the buckets, substantially as described.

2. In an acetylene-gas generator, the combination with a receptacle for water, of a rod revolubly mounted in said generator and having a ratchet-wheel secured thereon, a carbid-container mounted on said rod to turn there-

with and comprising a circular frame having a series of buckets pivotally mounted therein on axes substantially radial of the said frame, means for revolving said rod comprising a crank-rod, having at one end a pivoted dog engaging the teeth of said ratchet-wheel and at its other end a lever-arm, a gas-holder having a bell, a rod connected to said bell at its upper end and having its lower end operatively connected with said lever-arm, and stationary means engaged by the buckets in the revolution of the container to automatically and successively upset said buckets, substantially as described.

3. In an acetylene-gas generator, the combination with a receptacle for water, of a rod revolubly mounted in said generator, a carbid-container mounted on said rod to turn therewith, and comprising a frame carrying a series of pivoted buckets, means operating in the revolution of the container to upset said buckets, a gas-holder having a bell, and means for revolving said rod comprising a ratchet-wheel secured thereon, a crank-rod having at one end a pivoted dog engaging the teeth of said ratchet-wheel and at its other end a lever-arm having a bifurcated end affording a long lower arm and a short upper arm, and a rod secured to said bell at its upper end and having at its lower end a pin engaging said upper and lower arms and working in the bifurcation of said lever-arm, the combination operating substantially as described.

4. In an acetylene-gas generator, the combination with a receptacle for water, of a revoluble carbid-container mounted above the same and comprising a circular frame having a series of buckets pivotally mounted therein on radial lines, said buckets being tapered from their outer to their inner ends to permit turning of same, a rack located below said container and a series of teeth carried by each bucket and adapted in the revolution of the container to successively engage said rack whereby to upset said buckets, substantially as described.

5. A safety device for acetylene-gas generators, comprising a tube communicating with the water-compartment thereof and having a vertical extension communicating at its outer end with the air, cocks in said tube for ascertaining the water-level, a branch pipe communicating with said vertical pipe for supplying water to the generator, and a valve in said branch pipe, the combination operating as set forth.

6. In an acetylene-gas generator, the combination with a gas-holder of a liquid-seal device interposed between said generator and holder comprising a chamber having secured on its inner side near the bottom thereof a circular plate provided with a central aperture, a tubular extension depending from said aperture and having its lower end located above the bottom of the chamber, said tube



affording an annular space between its wall  
and the wall of the chamber, a pipe leading  
from the generator and into said annular  
space, said chamber containing water, the  
5 level whereof is normally below the opening  
of said pipe in the annular space, and a pipe  
leading from said chamber to the gas-holder;  
the combination operating as set forth.

In testimony whereof I have hereunto set  
my hand in presence of two subscribing wit- 10  
nesses.

EDWARD S. MARTINDALE.

Witnesses:

JAMES L. NORRIS,  
F. B. KEEFER.