

No. 751,928.

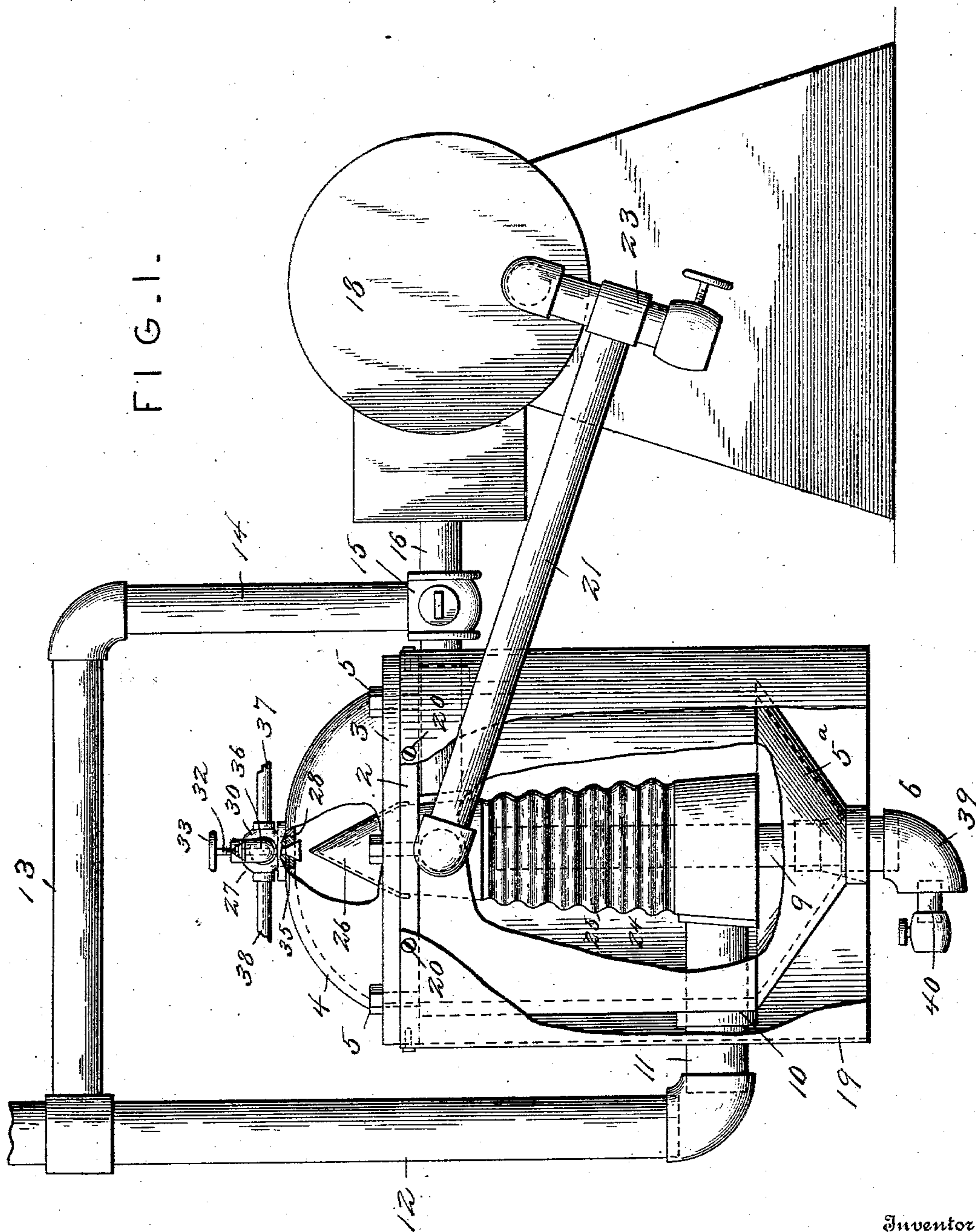
PATENTED FEB. 9, 1904.

J. L. LAWRENCE & G. W. STEWART.
OIL GAS GENERATOR FOR EXPLOSIVE ENGINES.

APPLICATION FILED JULY 25, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses

Harry L. Amer.
Chas. S. Hoyer.

Inventors

James L. Lawrence
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By

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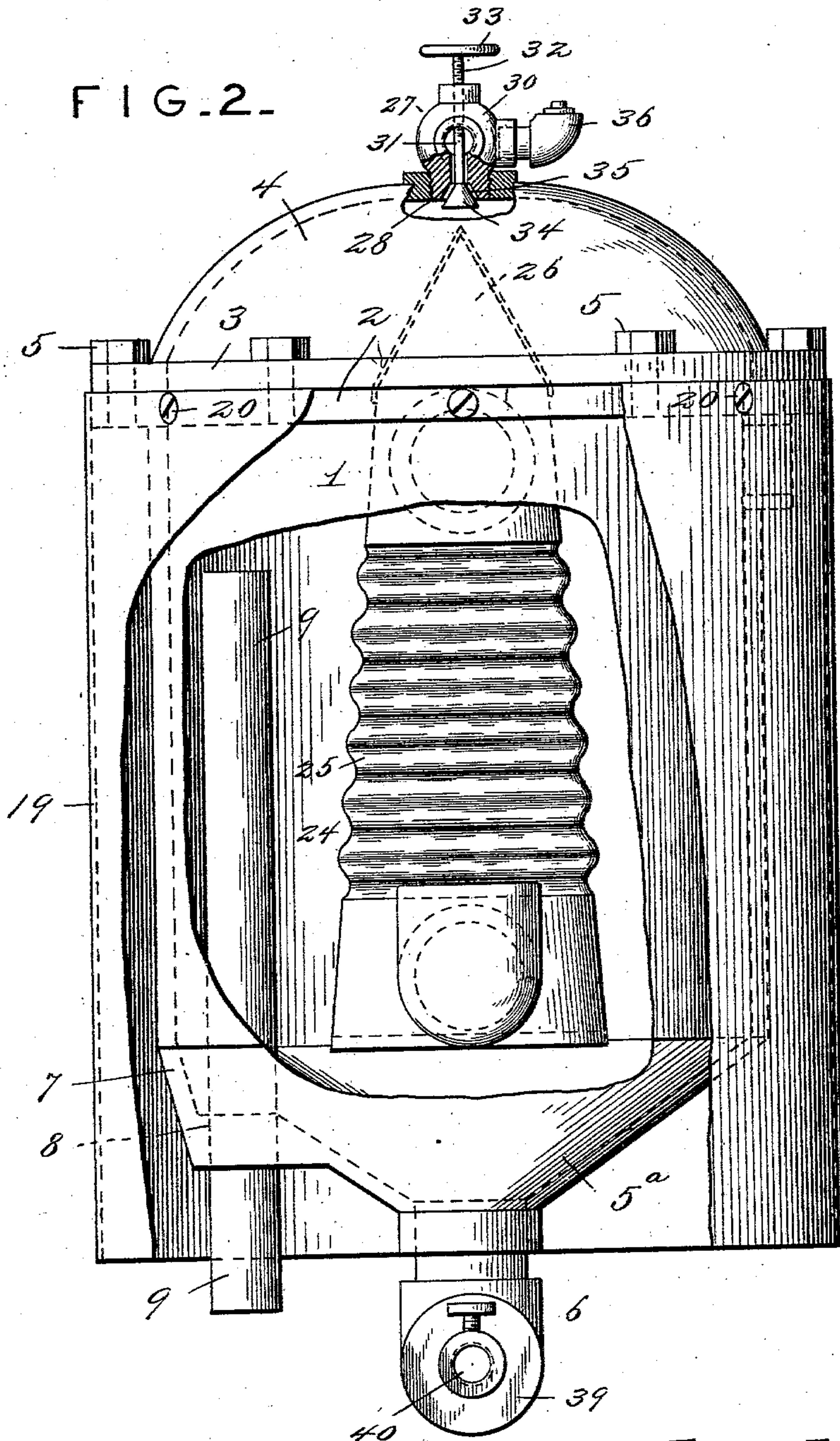
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4 SHEETS—SHEET 3.

FIG. 4.

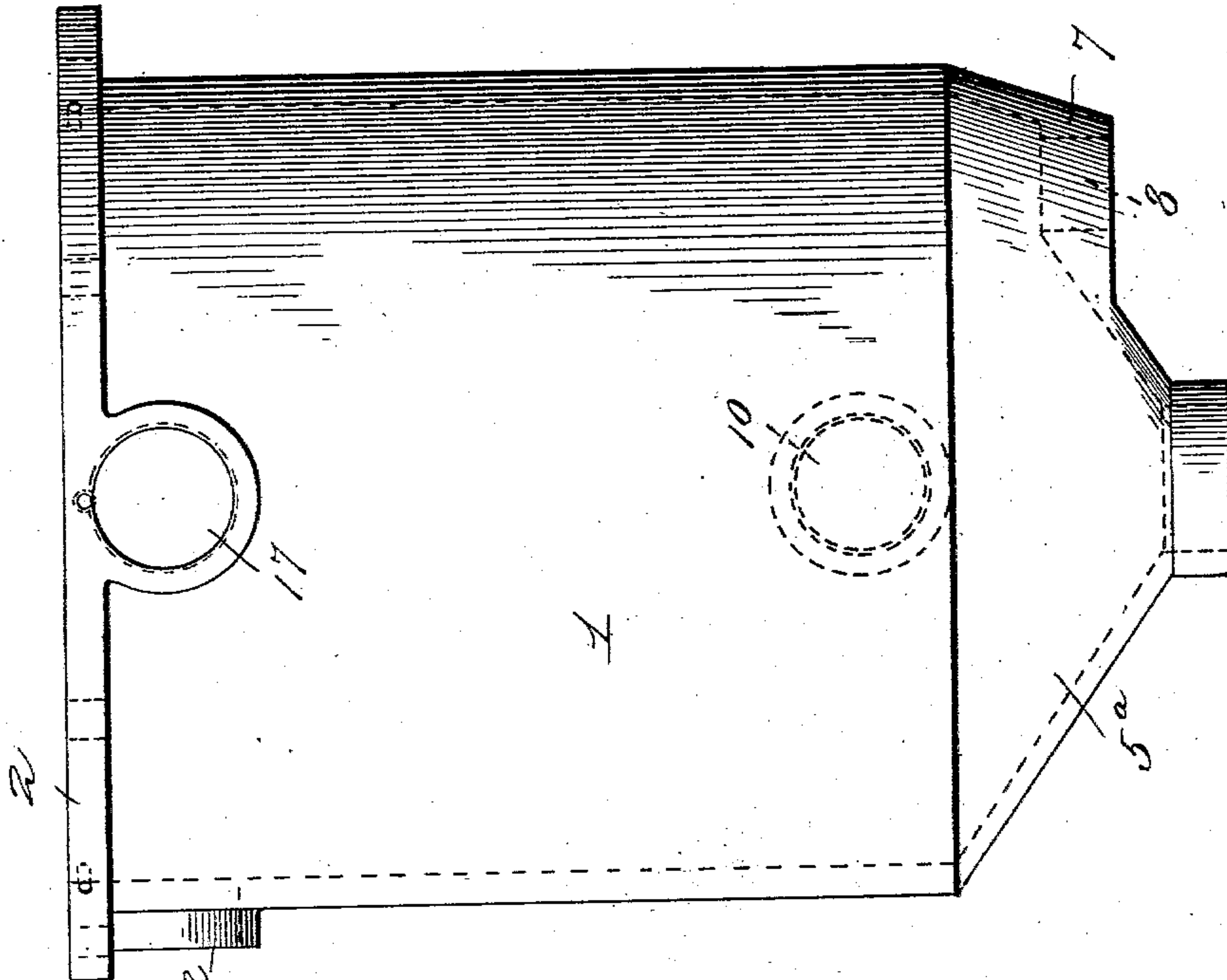
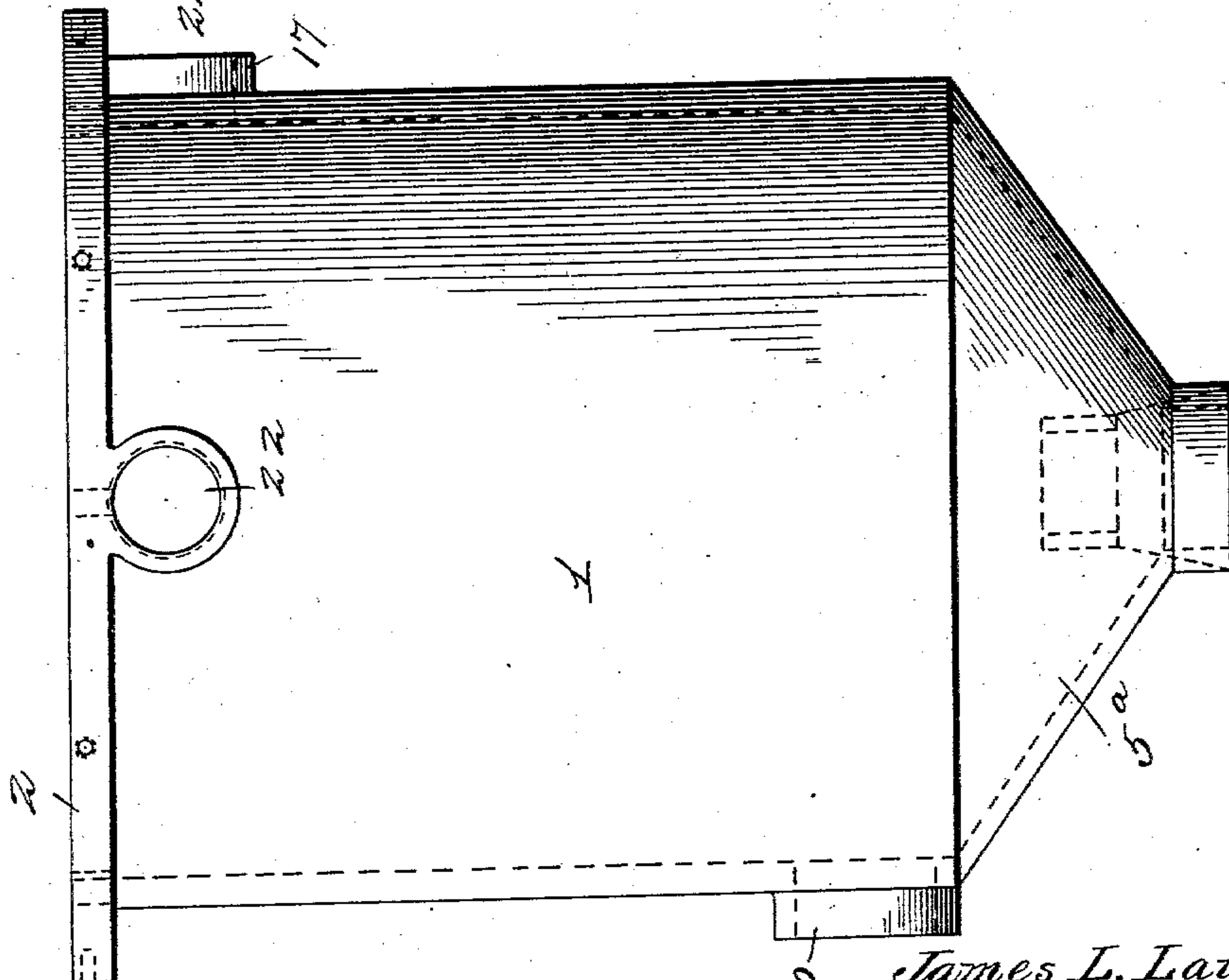


FIG. 3.



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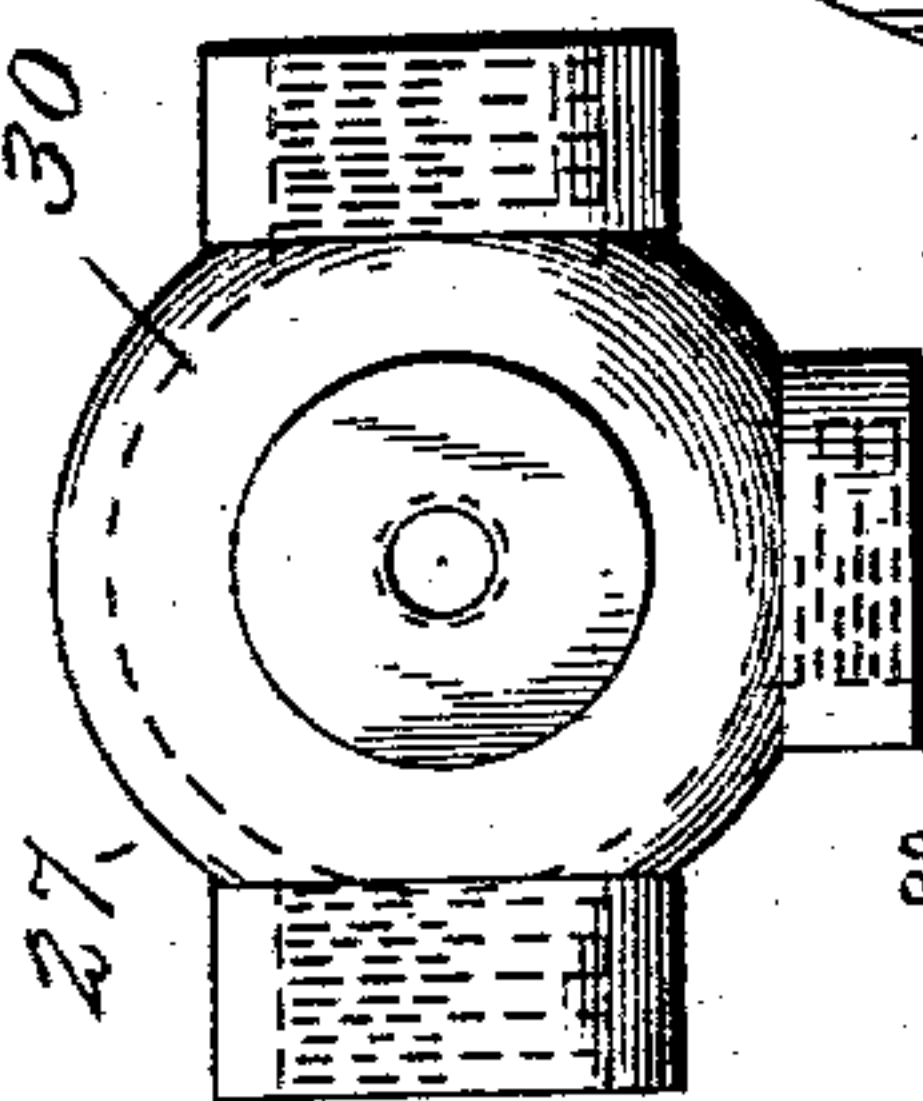
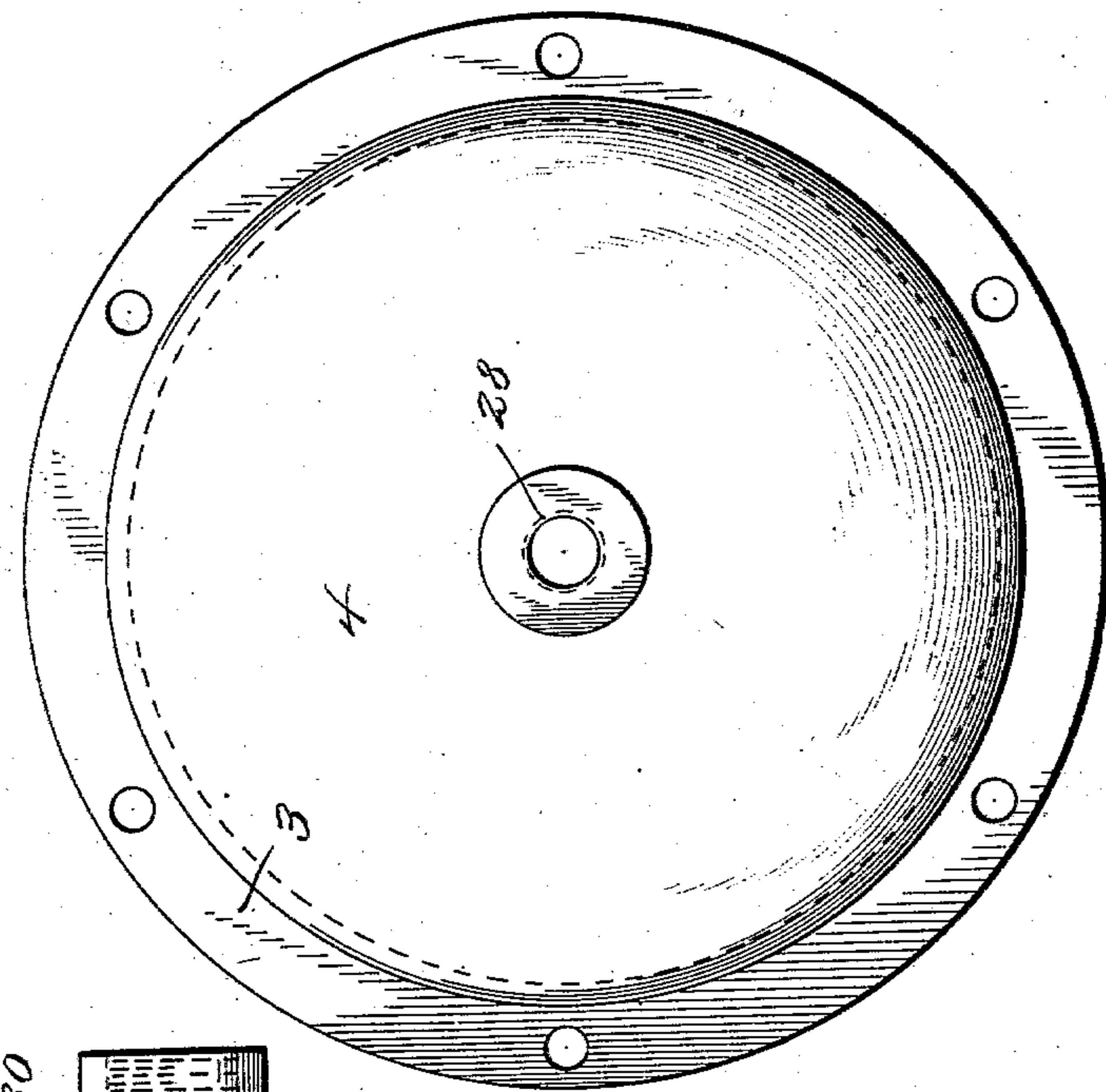
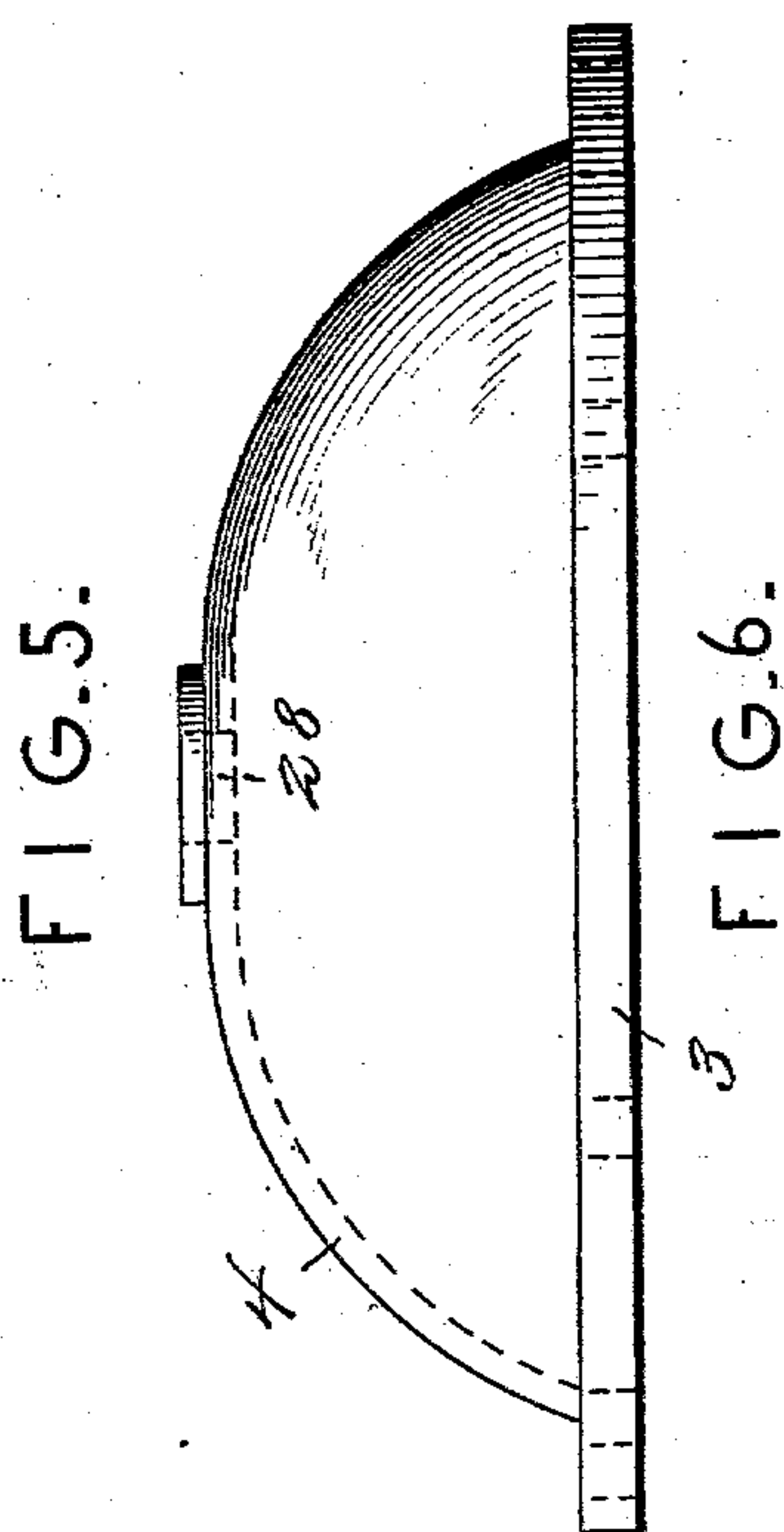
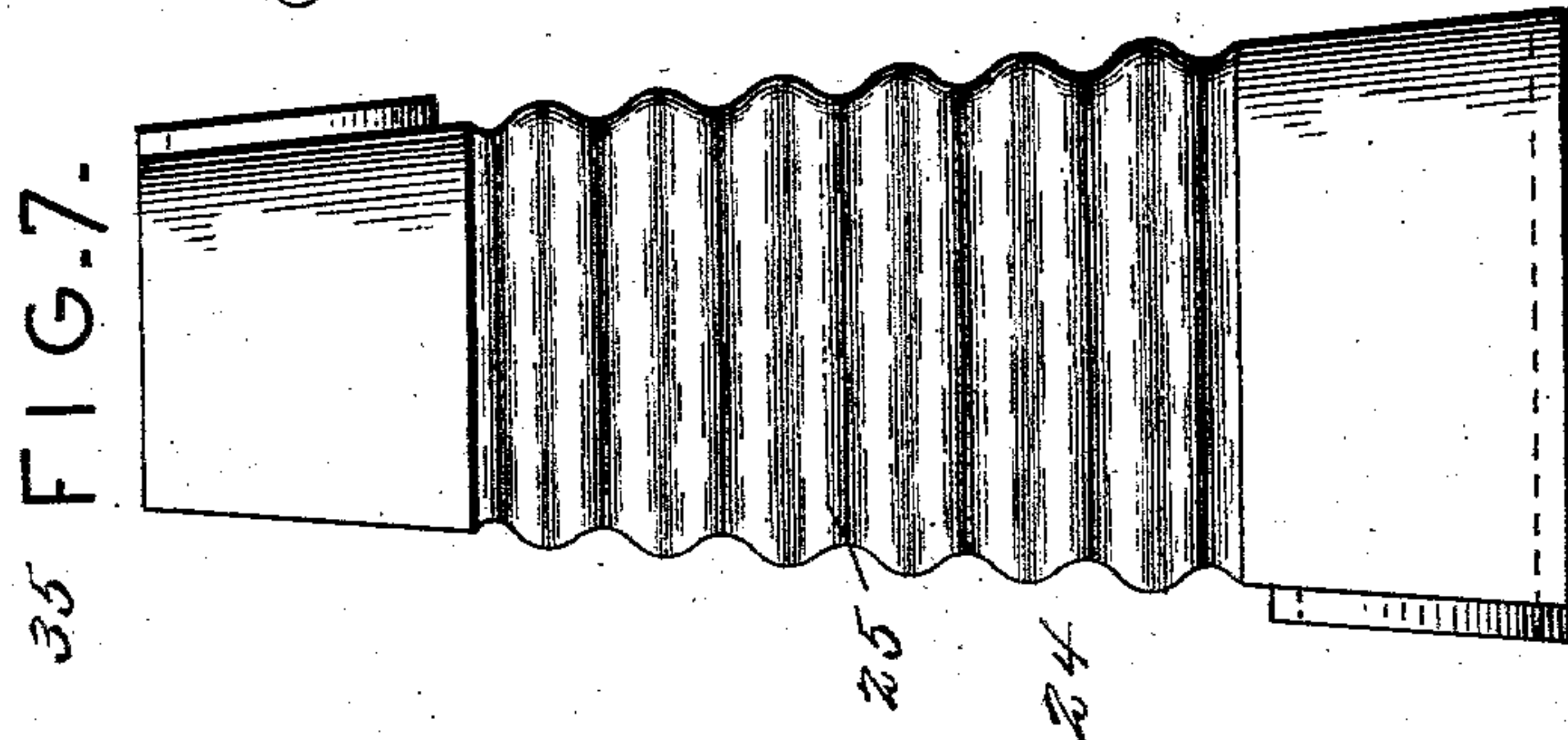
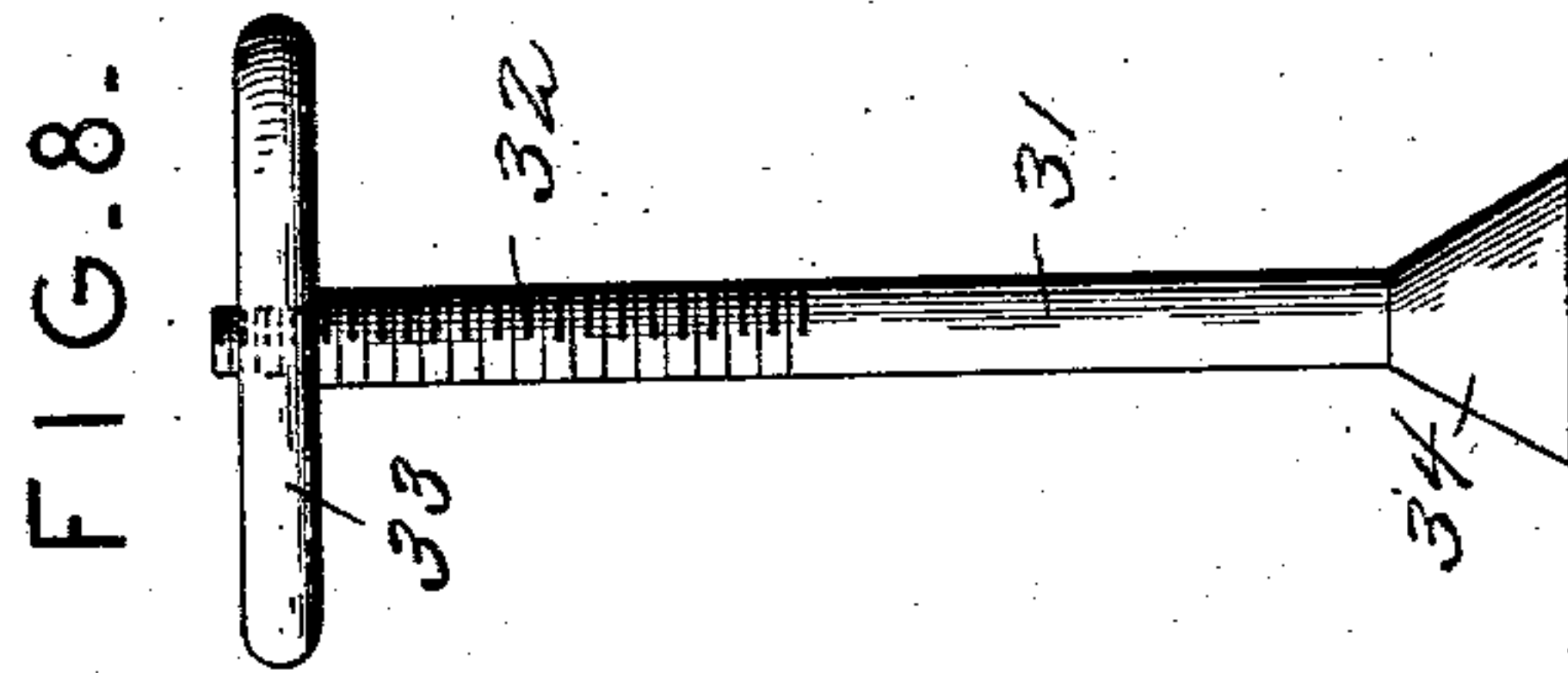
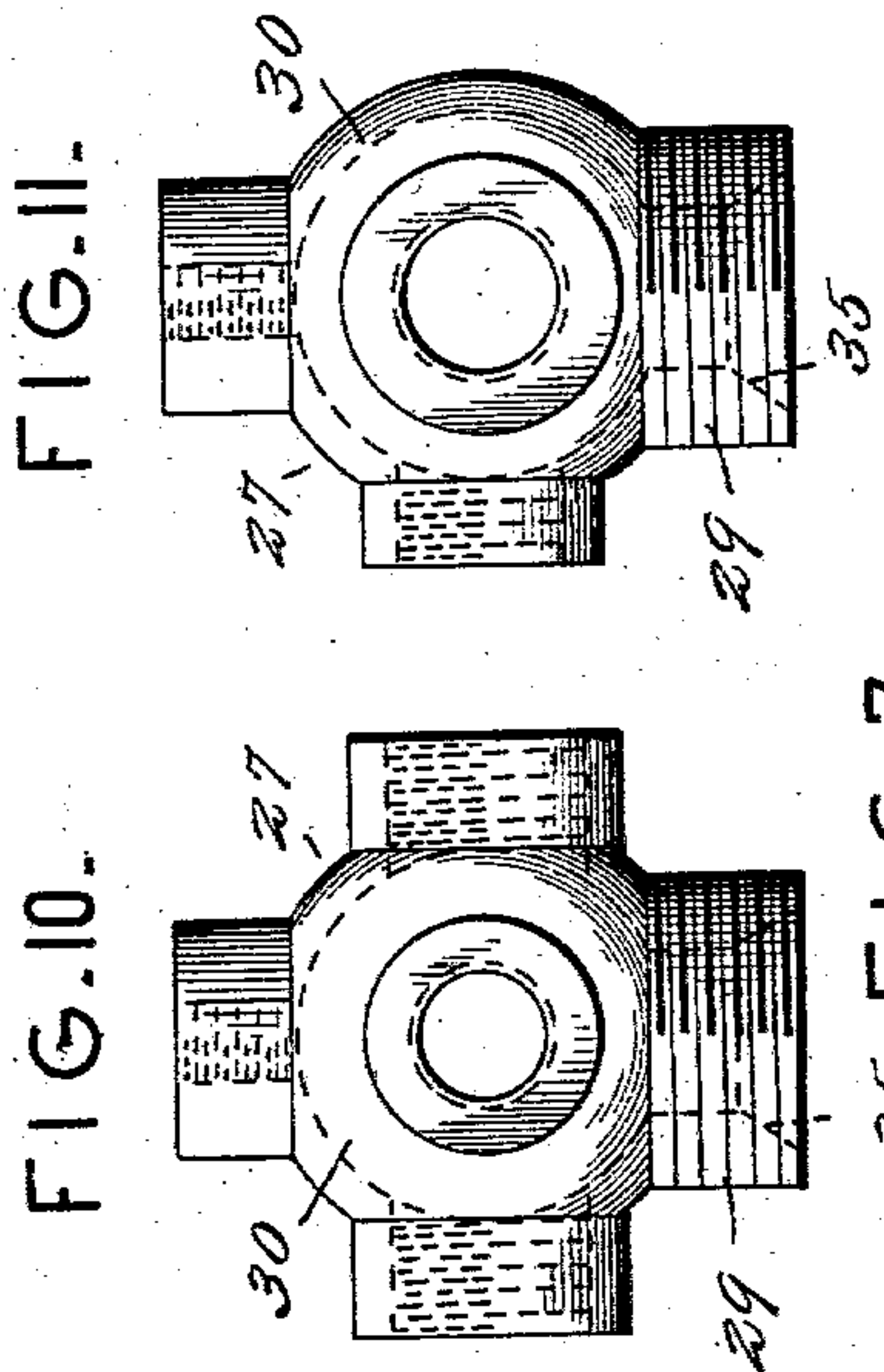
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JAMES LOUIS LAWRENCE AND GEORGE WILLIAM STEWART, OF
EL PASO, TEXAS.

OIL-GAS GENERATOR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 751,928, dated February 9, 1904.

Application filed July 25, 1903. Serial No. 167,013. (No model.)

To all whom it may concern:

Be it known that we, JAMES LOUIS LAWRENCE and GEORGE WILLIAM STEWART, citizens of the United States, residing at El Paso, in the county of El Paso and State of Texas, have invented new and useful Improvements in Oil-Gas Generators for Explosive-Engines, of which the following is a specification.

This invention relates to an oil-gas generator for use in connection with a gas-engine or other device and wherein gas is formed from crude oil by means of the heat of the exhaust from the gas, gasoline, or distillate engines or by means of other heat and wherein also there is a continuous drain or outlet for the residue resulting from the crude oil treated to produce the gas.

The objects of the invention are to provide a generator wherein a continuous spray of oil will be evenly distributed over the vaporizing element and at all times under the absolute control of the operator as to the quantity permitted to enter the apparatus; to facilitate the utilization of heat from the exhaust of an engine and to control the entrance of such exhaust into the apparatus either as a whole, partially, or entirely exclude the same, as conditions may require; to provide a generator having simple means for permitting a sufficient quantity of air to enter the same and become properly commingled with the vaporized oil and to have means whereby the amount of air admitted can be instantly changed, and to provide a generator of this class with an outlet-bottom whereby a continuous drain for the residue from the crude oil will result.

With these and other objects and advantages in view the invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is an elevation of a generator embodying the features of the invention and shown broken away in part and attached to an engine to illustrate one mode of application of the same. Fig. 2 is an enlarged elevation of the generator broken away in part and looking toward a different portion thereof. Fig. 3 is a detail elevation of an in-

ner cast-steel jacket, forming a part of the generator. Fig. 4 is a detail elevation of the jacket shown by Fig. 3 in a different position. Fig. 5 is a side elevation of a dome secured to the generator. Fig. 6 is a top plan view of the dome. Fig. 7 is a detail elevation of the inner vaporizing-cylinder. Fig. 8 is an enlarged elevation of the controlling-valve and stem cooperating with a regulating-valve carried by the dome. Fig. 9 is a top plan view of the regulating-valve casing, showing the passages leading thereinto. Fig. 10 is an elevation of the regulating-valve casing looking toward the front. Fig. 11 is a side elevation of the regulating-valve casing.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a cylindrical jacket, preferably formed of cast-steel and having an outstanding flange 2 at its upper edge, to which is removably attached the flange 3 of a dome 4 of similar metal, screw-bolts or analogous fastenings 5 extending downwardly through the flange 3 into the flange 2 to firmly hold the jacket and dome in connected relation. The form of the jacket is clearly shown by Figs. 3 and 4, and the lower extremity thereof is provided with a hopper-shaped bottom 5^a to serve as a drain means, the lower reduced portion of said bottom having a valve 6 applied thereto and removable therefrom at will. To one side of the center the hopper-shaped bottom 5^a is formed with an angular offset 7, having an opening 8 extending therethrough for the application of an air-inlet pipe 9, which projects upwardly into the jacket and has a lower open end for the unretarded entrance of air into the generator. Near the bottom 5^a the body of the jacket 1 has an opening 10, with a surrounding flange for the passage therethrough of the outlet member 11 of an exhaust-escape pipe 12, projecting upwardly and connecting with a branch exhaust-escape pipe 13, having a depending member 14 connecting with a three-way valve 15, readily operative from the exterior and located in the exhaust-supply pipe 16, which passes through an upper open-

ing 17 in the jacket close to the flange 2. The exhaust-pipe 16 is shown connected to a gas-engine 18; but it will be appreciated that instead of using the exhaust of the engine 18 for heating the generator any other heating medium may be fed through the said pipe, particularly when the generator is used alone and not in direct connection with a gas-engine.

A sheet-iron jacket 19 surrounds the jacket 1 and has its upper end secured to the flange 2 by screws or other fastenings 20 and its lower end fully open, said sheet-iron jacket having suitable openings therein for the passage therethrough of the pipes 11 and 16 and also an opening for the attachment of the upper end of a gas-feed pipe 21, which connects with an opening 22 in the upper portion of the jacket 1 in a plane at right angles to the opening 17, the opposite terminal of said gas-feeding pipe being attached to a valve-coupling 23, communicating with the cylinder of the gas-engine, as shown by Fig. 1, or said coupling may be attached to a suitable reservoir.

Centrally positioned within the jacket 1 is a vaporizer 24, formed of copper and having an intermediate corrugated body 25. The vaporizer 24 is hollow, and with the upper extremity thereof the exhaust-pipe 16 connects and to the lower end the outlet-exhaust pipe 11 is secured. The lower end of the vaporizer is closed, and the shape of said vaporizer is approximately conical. On the upper end of the vaporizer is a conical cap 26, with its apex located directly under and below the center of the dome 4, said cap projecting upwardly into the dome, as clearly shown by Figs. 1 and 2. The exhaust gases, steam, or other heating medium passing through the pipe 16 into the vaporizer 24 thoroughly heats the latter and then escapes through the pipe 11, this heating operation continuing until the generator has acquired a temperature which is of the required degree to effectually carry on the formation of the gas. As is well known, copper gives off heat very rapidly, and, further, that cast-steel retains heat for a considerable length of time, and hence the use of copper in the formation of the vaporizer and the use of cast-steel in constructing the jacket 1 is materially advantageous, and after all of the parts have become thoroughly heated the jacket 1 will assist in maintaining the necessary degree of temperature within the generator, and hence the three-way valve 15 can be at times operated to close out the exhaust from the generator and permit it to pass upwardly through the depending member 14 into the pipe 13 and escape through the pipe 12 without traversing the vaporizer.

A controlling-valve casing 27 is attached to the dome 4, the latter having a centrally-screw-threaded opening 28 to receive the attaching-neck 29 of said valve-casing. The body 30 of the valve-casing is approximately globular, and extending downwardly therethrough is a

stem 31, having an upper screw-threaded portion 32 and an operating hand-wheel or analogous device 33. On the lower end of the stem is a conical valve 34, which is movable into and outwardly from a seat 35, formed in the neck 29. An air-vent 36, of any approved form, is connected to the center of the front of the body 30 of the valve 27, and in planes at right angles to the position of the said air-vent an oil-feed pipe 37 and an oil-overflow pipe 38 are connected to the body of the valve at diametrically opposite points. The valve 34 on the lower end of the stem 31 is positioned above and directly over the apex of the cone 26 at the upper end of the vaporizer 24, so that the oil passing from the valve into the generator flows on the cone 26 and moves downwardly over the vaporizer, being retarded in its descent to a limited extent by the intermediate corrugated body 25 to render the vaporization of the oil practically effective. As will be understood, the said cone is practically a distributor for spreading the oil and causing it to flow evenly to all sides of the vaporizer at the same time, thus materially assisting or enhancing the vaporizing process.

The oil coming through the pipe 37 from a suitable source of supply enters the body 30 of the valve 27 and is permitted to escape in quantities that may be regulated at will through the valve-seat 35, the amount of oil passing downwardly through the valve 27 into the generator depending upon the adjustment of the valve 34 in relation to the seat 35. During this operation the air that may be within the valve-casing 27 is forced out or permitted to escape through the vent 36, and should the inflow of oil into the body 30 be excessive relatively to the feed thereof to a generator the excess of oil escapes through the overflow-pipe 38 and returns to the source of supply. The oil, as before stated, in passing down over the heated vaporizer 24 is reduced to a vapor and the residue flows downwardly from the bottom of the said vaporizer into the hopper-shaped bottom 5^a of the jacket 1, and from said hopper-shaped bottom the residue may be drawn off through the valve 6, which will be more fully hereinafter referred to. As the oil is vaporized within the closed jacket 1, the air from the exterior is drawn into said jacket through the pipe 9 and commingles with the vaporized oil in proper proportions to produce a gas, the gas escaping through the pipe 21 into the gas-engine 18, or it may be carried off to some storage-receptacle.

The advantages of the vaporizer 24, constructed as set forth, are manifold, and among others may be mentioned that the oil is more evenly distributed thereover, thus enabling the user to obtain the benefit of all the heating-surface exposed to the oil by the said vaporizer. In vaporizers as heretofore constructed, having spirals extending there-

around or provided with cups, the disadvantage presented is the retardation of the flow of oil and a consequent deposit on such vaporizers of the residue from the crude oil, which will obstruct the vaporizers from having a full heating effect on the oil passing thereover. In the present construction of vaporizer the oil is free to engage any part of the exterior surface thereof and the collection of residue on such surface is reduced to a minimum and scale formation on the vaporizer is prevented. Hence the vaporizer in the improved structure uniformly operates to vaporize the crude oil and insure the production of sufficient fuel for an engine working under a load.

A further advantage in forming the vaporizer of copper is that the oil will not cling to the surface thereof, as it does to steel or iron. When the generator is attached to a gas-engine, the latter takes a charge of gas by suction from the generator in the same manner as it takes a charge of gasoline, and the gas is not forced into the generator and there is no pressure in the latter.

From a structural standpoint another advantage of the generator is its light weight from a comparative standpoint and also the convenience in assembling the several parts.

The valve 6 is attached to a union 39, connected to the lower reduced extremity of the hopper-shaped bottom 5^a, the lower terminals of the union being closed and having a reduced valve-outlet 40 connected thereto, whereby the residuum may run off from the said bottom 5 in a convenient and expeditious manner.

Changes in the proportions, dimensions, and minor details may be resorted to without in the least departing from the spirit of the invention.

Having thus fully described the invention, what is claimed as new is—

1. An oil-gas generator, comprising a jacket surmounted by a dome, and provided with a conical bottom having a valve, said dome connecting with an oil-supply, a vaporizer closed at its lower end, and surmounted by a closed conical oil-spreader, an exhaust-pipe from an engine communicating with the upper part of the vaporizer, and provided with a three-way valve, an exhaust-escape pipe leading from the lower part of the vaporizer, a pipe connecting said escape-pipe with the casing of said valve, and a gas-supply pipe leading from said jacket to a suitable point of delivery.

2. An oil-gas generator, comprising a jacket surmounted by a dome, and provided with a

conical bottom having a valve, said dome connecting with an oil-supply, a vaporizer closed at its lower end, and surmounted by a closed conical oil-spreader, an exhaust-pipe from an engine communicating with the upper part of the vaporizer, and provided with a three-way valve, an exhaust-escape pipe leading from the lower part of the vaporizer, a pipe connecting said escape-pipe with the casing of said valve, a gas-supply pipe leading from said jacket to a suitable point of delivery, and an air-supply pipe extending into the jacket.

3. An oil-gas generator, comprising a jacket surmounted by a dome, and provided with a conical bottom having a valved outlet for oil residue, said dome having an oil-inlet opening and a valve controlling the latter, a casing for the valve, and an oil-supply pipe and an overflow-pipe connecting with said casing, a vaporizer closed at its lower end, and surmounted by a closed conical spreader having the apex thereof in line with said inlet-opening, an exhaust-pipe from an engine communicating with the upper part of the vaporizer, and provided with a three-way valve, an exhaust-escape pipe leading from the lower part of the vaporizer, a pipe connecting said escape-pipe with the casing of said three-way valve, and a gas-supply pipe leading from said jacket to a suitable point of delivery.

4. An oil-gas generator, comprising a jacket surmounted by a dome, and provided with a conical bottom having a valved outlet for oil residue, said dome having an oil-inlet opening and a valve controlling the latter, a casing for the valve, and an oil-supply pipe and an overflow-pipe connecting with said casing, a vaporizer closed at its lower end, and surmounted by a closed conical spreader having the apex thereof in line with said inlet-opening, an exhaust-pipe from an engine communicating with the upper part of the vaporizer, and provided with a three-way valve, an exhaust-escape pipe leading from the lower part of the vaporizer, a pipe connecting said escape-pipe with the casing of said three-way valve, and a gas-supply pipe leading from said jacket to a suitable point of delivery, the walls of said vaporizer being cone-shaped and constructed with annular corrugations.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES LOUIS LAWRENCE.
GEORGE WILLIAM STEWART.

Witnesses:

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J. E. THRUSTON.