

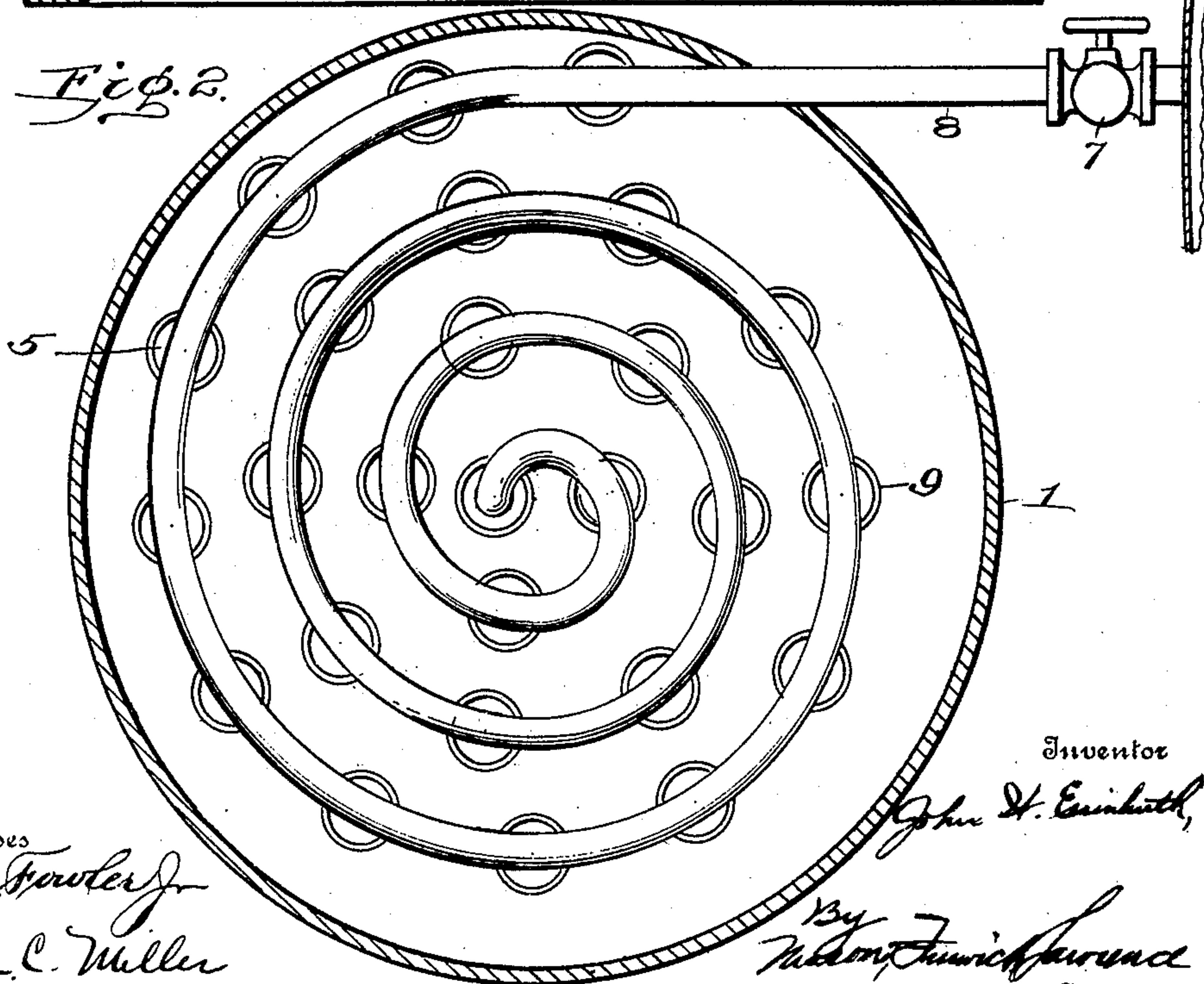
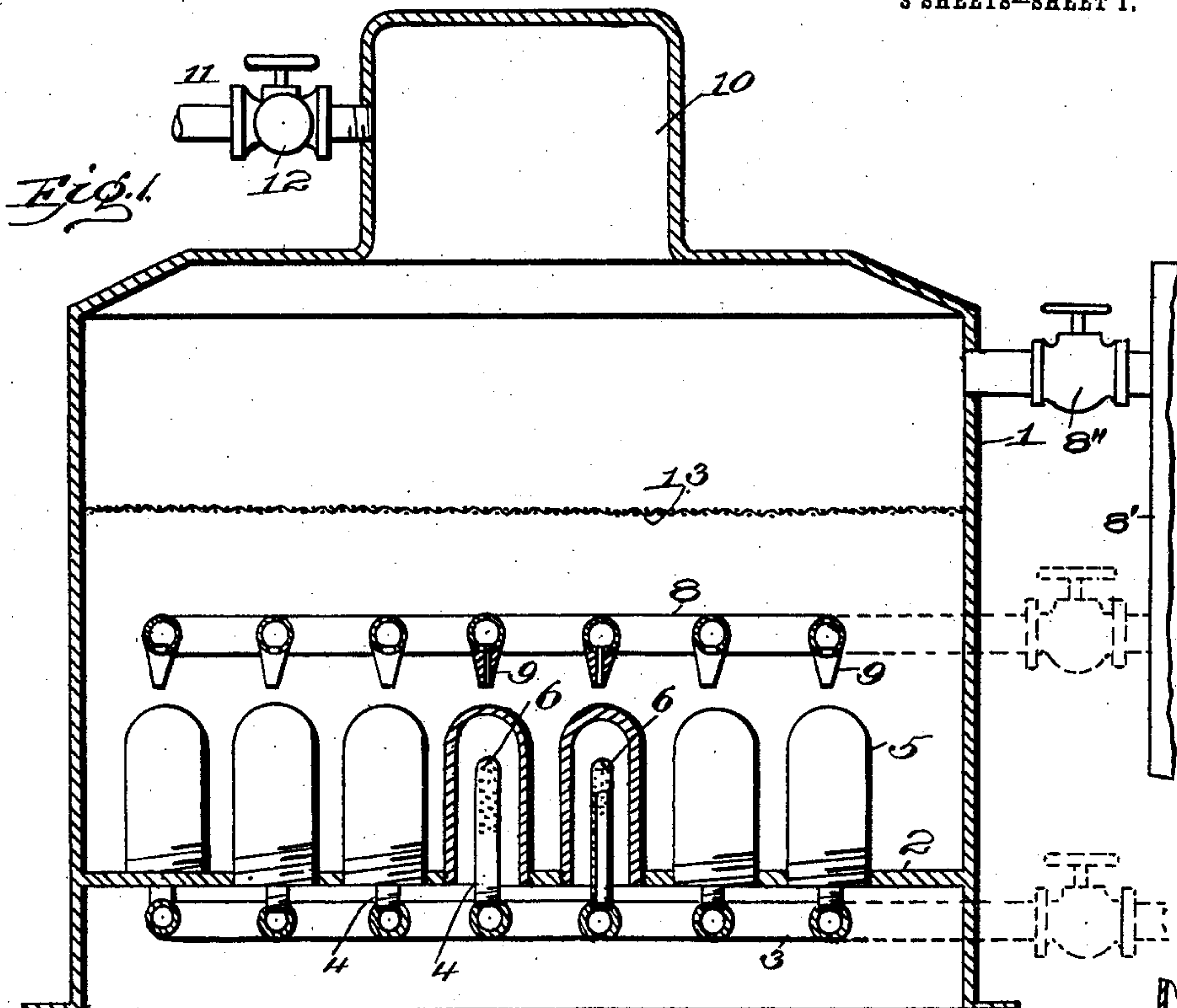
No. 833,780.

PATENTED OCT. 23, 1906.

J. W. EISENHUTH.
STEAM GENERATOR.

APPLICATION FILED JUNE 29, 1905.

3 SHEETS—SHEET 1.



Witnesses
J. M. Fowler Jr.
Jesse C. Miller

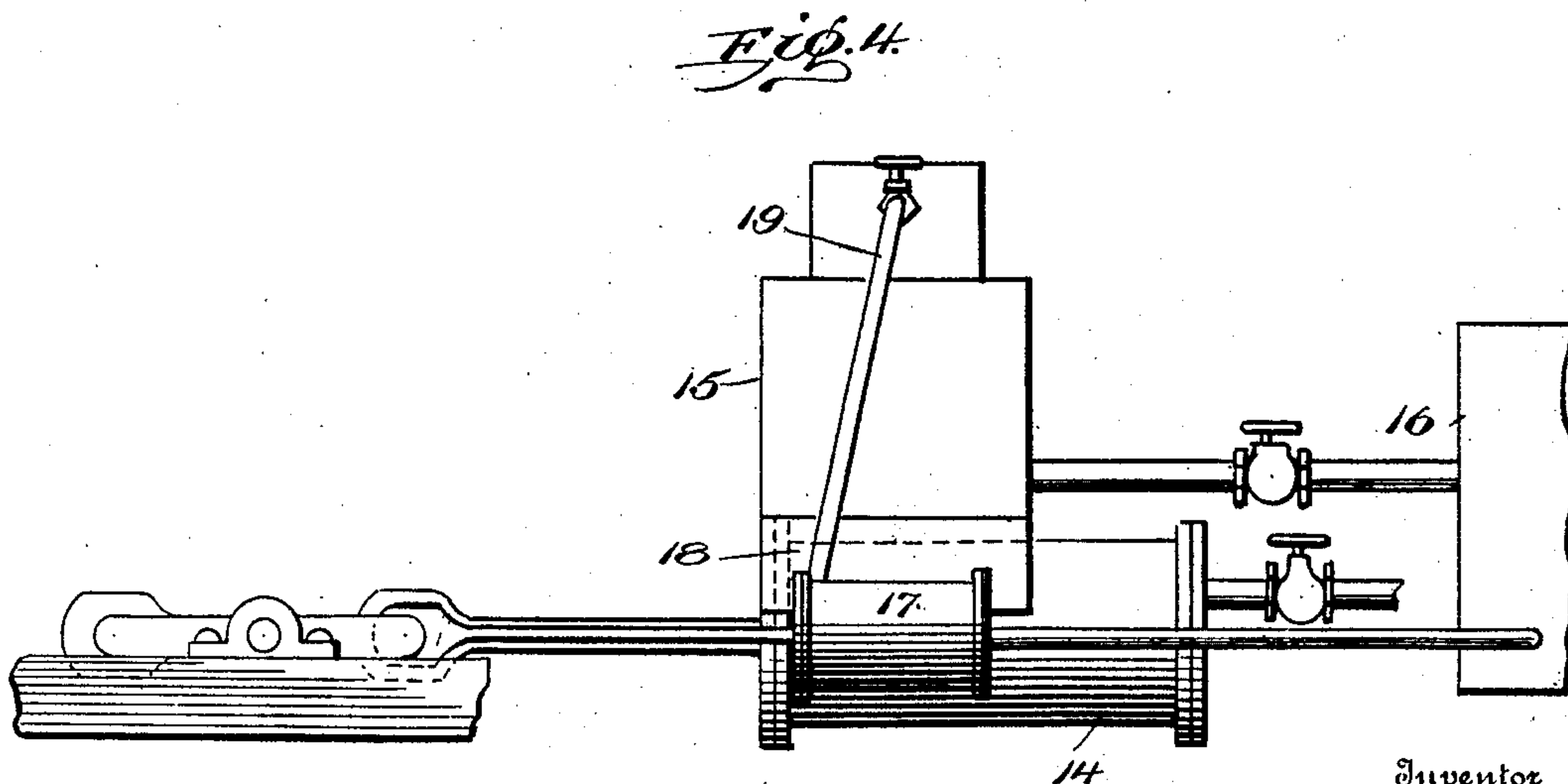
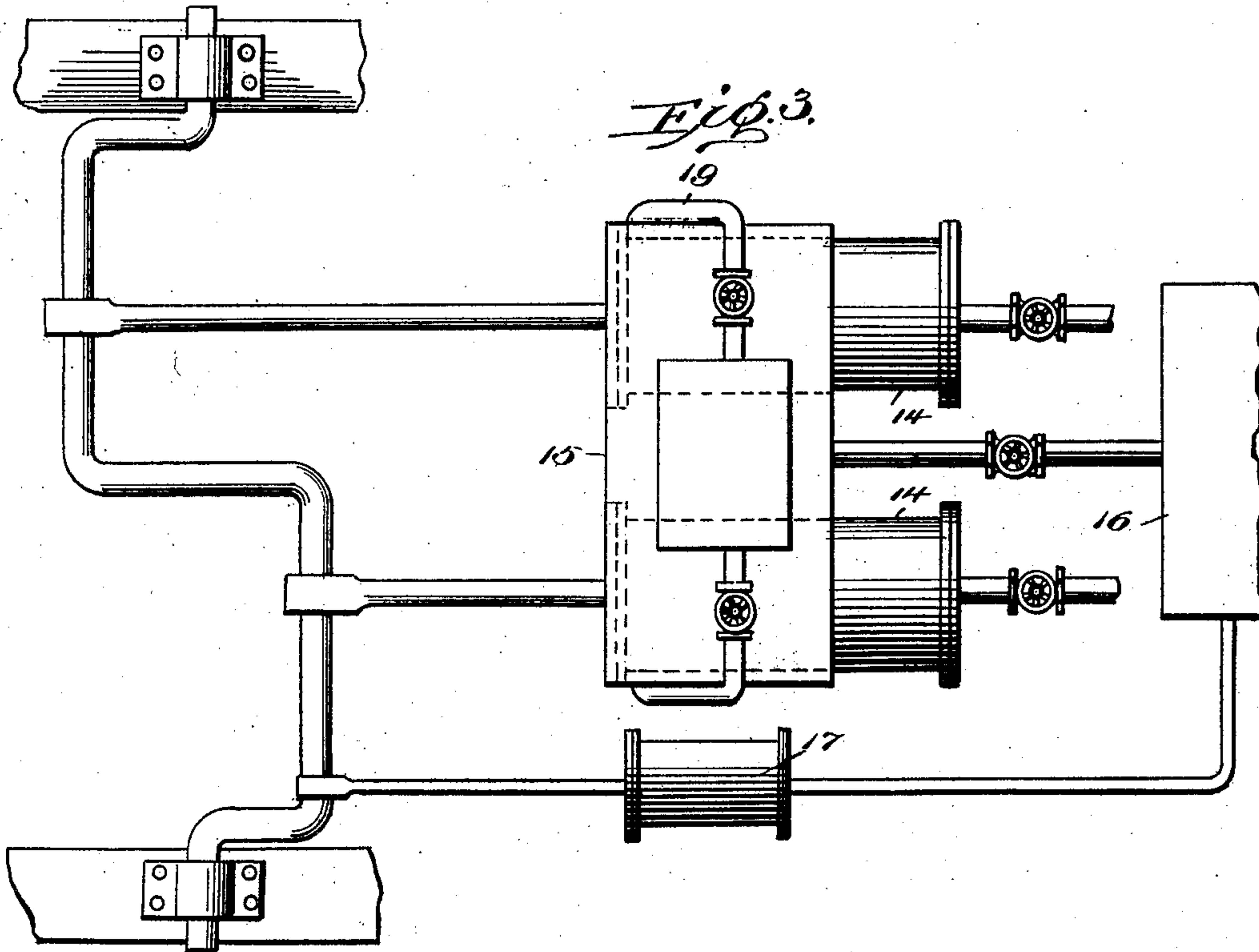
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3 SHEETS—SHEET 2.



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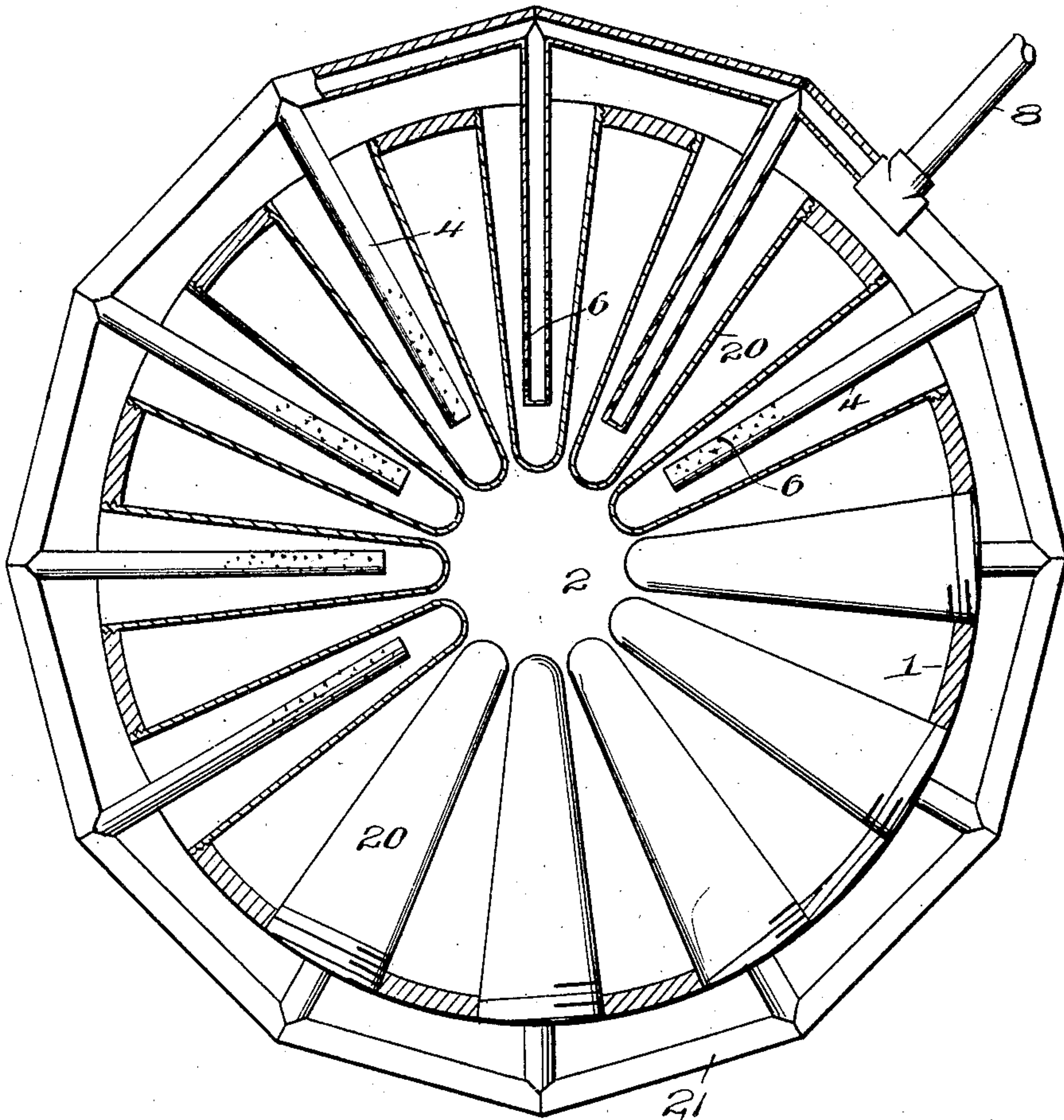
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3 SHEETS—SHEET 3.

Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN W. EISENHUTH, OF BROOKLYN, NEW YORK.

STEAM-GENERATOR.

No. 833,780.

Specification of Letters Patent.

Patented Oct. 23, 1906.

Application filed June 29, 1905. Serial No. 267,670.

To all whom it may concern:

Be it known that I, JOHN W. EISENHUTH, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in steam generators or boilers; and its object is to provide such a generator or boiler with means by which water may be rapidly converted into steam without employing the usual bulky and cumbersome devices now in common use.

It consists in a boiler having a series of inwardly-projecting heating-surfaces, burners, or other heating means extending into said projections for heating them, and means for dropping water upon the said inwardly-extending projections, so that the said water will be rapidly converted into steam.

It also consists in certain other novel constructions, combinations, and arrangements of parts as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 represents a vertical central section through a steam-boiler embodying my invention. Fig. 2 is a horizontal cross-section through the lower part of the same looking at the burner-tubes arranged beneath the floor of the burner. Fig. 3 is a top plan view of an engine provided with a boiler like that shown in Figs. 1 and 2. Fig. 4 is a side elevation of the same. Fig. 5 is a horizontal cross-section through a boiler provided with my improved burners, the said burners extending through the side walls of the boiler and radially toward the center thereof.

The boiler or steam-generator which forms the subject of the present invention is designed to occupy very little space and yet be capable of generating large quantities of steam in a small space of time, the water being converted into steam almost instantly upon reaching the heated surfaces of the boiler.

In embodying the invention in a practical form I provide a boiler 1 of suitable size and form, a floor 2 being arranged in the said boiler a short distance above the lower edge thereof, so that piping 3 may be extended

beneath the said floor and deliver fuel or combustible materials to a series of burners 4, attached to said piping. The floor 2 is provided with a number of perforations in which are inserted a series of tubes or hollow projections 5, which extends into the boiler 1 and are closed at their inner ends, as clearly seen in Fig. 1. The tubes 5 are made of sufficient size to receive the burners 4 of the piping 3, the said burners projecting well into the tubes 5 and being formed of piping inclosed at their outer ends and formed with a series of perforations 6. The piping 3 is controlled by a suitable cock or valve 7, located outside the boiler 1. I find that by forcing a mixture of air and hydrocarbon vapor into the piping 3 and to the burners 4 that the said combustible mixture can be ignited at the burners within the tubes 5, producing, as is well known, a high degree of heat.

The boiler may contain any suitable quantity of water which is desired to be converted into steam, the water lying in contact with tubes 5. Since tubes 5 can be brought to a very intense degree of heat by the hydrocarbon-burners within the same, the water is quickly converted into steam, which is lying against the tubes, and more water takes its place. A quicker way, however, of converting this water into steam is by causing the water to fall upon the tubes 5 in continuous small quantities, so that the water will be changed to steam almost instantly upon striking the hot tubes 5. The manner of accomplishing this is illustrated in Fig. 1, in which an inlet water-pipe 8 enters the boiler above the tubes 5 and is coiled around above the same, so that a series of discharge-nozzles 9 can thereby be located immediately above the closed ends of the tubes 5. The inflow of water into the pipe 8 may of course be controlled by a suitable stop-cock or valve, so that the water may be permitted to drop upon the tubes 5 in fine small streams or even drops, if desired, so that the water is spread in a fine film over the tubes 5 and is instantly effected by the heat thereof. As fast as steam is generated it fills the upper part of the boiler and a steam-dome 10, from which a steam-delivery pipe 11 extends, carrying the steam to any suitable point for use. The steam-delivery pipe may be controlled by a valve or cock 12.

I preferably separate the upper or dome part of the boiler 1 from the lower or generating part by a gauze diaphragm or screen, as

13, so that the steam becomes quickly separated from the water in the boiler. In case the boiler is used with water standing around the tubes 5, this screen is useful for preventing the water from boiling too high in the boiler.

Although the boiler 1 may be of any suitable shape, I have shown the same in Figs. 1 and 2 as cylindrical and have arranged the tubes 5 upon a spiral line in the bottom of the boiler, the inlet-piping 3 for the hydrocarbon and air being arranged spirally beneath the said tubes, as clearly seen in Fig. 2, so that it may be provided with a burner beneath each one of the tubes.

It will of course be apparent that the tubes and burners may be arranged in any suitable configuration as may be found most desirable for the use to which the boiler is put.

The pipe 8 is supplied with water from a tank 8' of any ordinary type, and in order to make it possible to supply water by gravity I connect the tank 8' by a pipe 8'' with the boiler 1, so that the water in the tank will be subjected to the same pressure as the pressure acting upon the water being discharged in the boiler, the thus balanced condition facilitating discharge by gravity.

I find a boiler of this character is particularly well adapted for use in direct connection with a steam-engine, the boiler being formed to occupy comparatively little space on the engine. Such an arrangement is illustrated in Figs. 3 and 4, in which a two-cylinder engine 14 is shown, and a boiler as 15, like that above described, is arranged above the ends of the two cylinders. The inlet-pipe for the hydrocarbon fuel preferably projects between the cylinders 14 14 to the boiler and may lead from a compression-chamber, as 16, in which the liquid hydrocarbon may be stirred, air being forced into and mixed with the fumes thereof by means of any suitable compressor, as 17, is adapted to be operated by the engine. The steam-dome connects with the valve-chest 18 of the engine-cylinders by means of pipes 19 19. It will be evident from this illustration that the steam-boiler can be fitted to any engine, so as to occupy a very small space and yet be sufficient to supply steam for the running of the engine.

As illustrated in Fig. 5, the tubes and burners may enter the boiler through the peripheral walls thereof. In this instance

the tube, as 20, are threaded into apertures made in the periphery of the boiler and preferably made somewhat smaller at their inner ends than at their outer ends, so that a greater number of tubes can be made to converge toward the center of the boiler than if they were all of the same size throughout. The burners project into the tubes as before, but are connected with a feed-pipe 21, which extends around the outside of the boiler. The operation and effect of the device is practically the same as that of the device above described. Of course the nozzles for supplying water upon these tubes should be differently arranged and made to come directly above the said tubes.

It will be evident that I might make various minor changes in arrangement and construction of the parts above described in connection with my invention without departing in the least from the spirit thereof.

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

1. A steam-generator, comprising a boiler, a series of tubular projections extending into said receptacle, means for heating the interior of said projections, a pipe coiled within the boiler, and means carried by the pipe for supplying water independently to each projection.

2. A steam-generator comprising a boiler having a series of apertures in one of its walls, inwardly-projecting tubes arranged in said apertures, and a series of burners projecting into the tubes from without the boiler, and a pipe coiled within the boiler for bringing small quantities of water into contact with the surface of the tubes projected within the boiler.

3. A steam-generator comprising a boiler having a number of tubes extending inwardly through and from the wall of the boiler, burners for heating the interior of said tubes, and a pipe coiled within the boiler for bringing water into engagement with the exposed surface of the device and whereby water in small quantities may be dropped into contact with the several projecting tubes.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. EISENHUTH.

Witnesses:

JOHN L. FLETCHER,
CASSELL SEVERANCE.

It is hereby certified that Letters Patent No. 833,780, granted October 23, 1906, upon the application of John W. Eisenhuth, of Brooklyn, New York, for an improvement in "Steam-Generators," were erroneously issued to "said Eisenhuth" as owner of said invention; that said Letters Patent should have been issued to *The Eisenhuth Horseless Vehicle Co., a corporation of Maine*, as assignee of the entire interest in said patent, as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of November, A. D., 1906.

[SEAL.]

E. B. MOORE,
Acting Commissioner of Patents.