

No. 633,274.

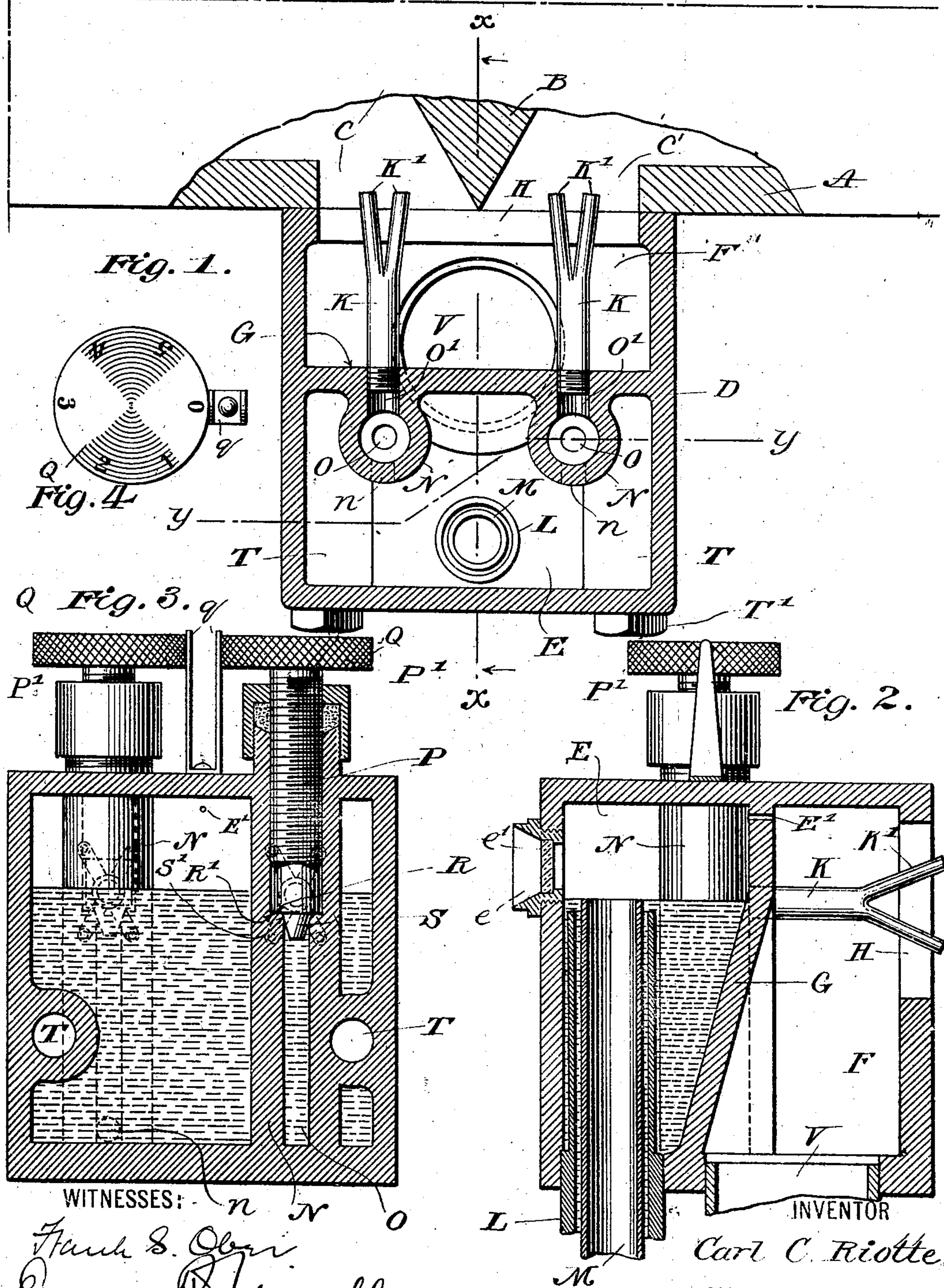
Patented Sept. 19, 1899.

C. C. RIOTTE.
VAPORIZER FOR GAS ENGINES.

(Application filed June 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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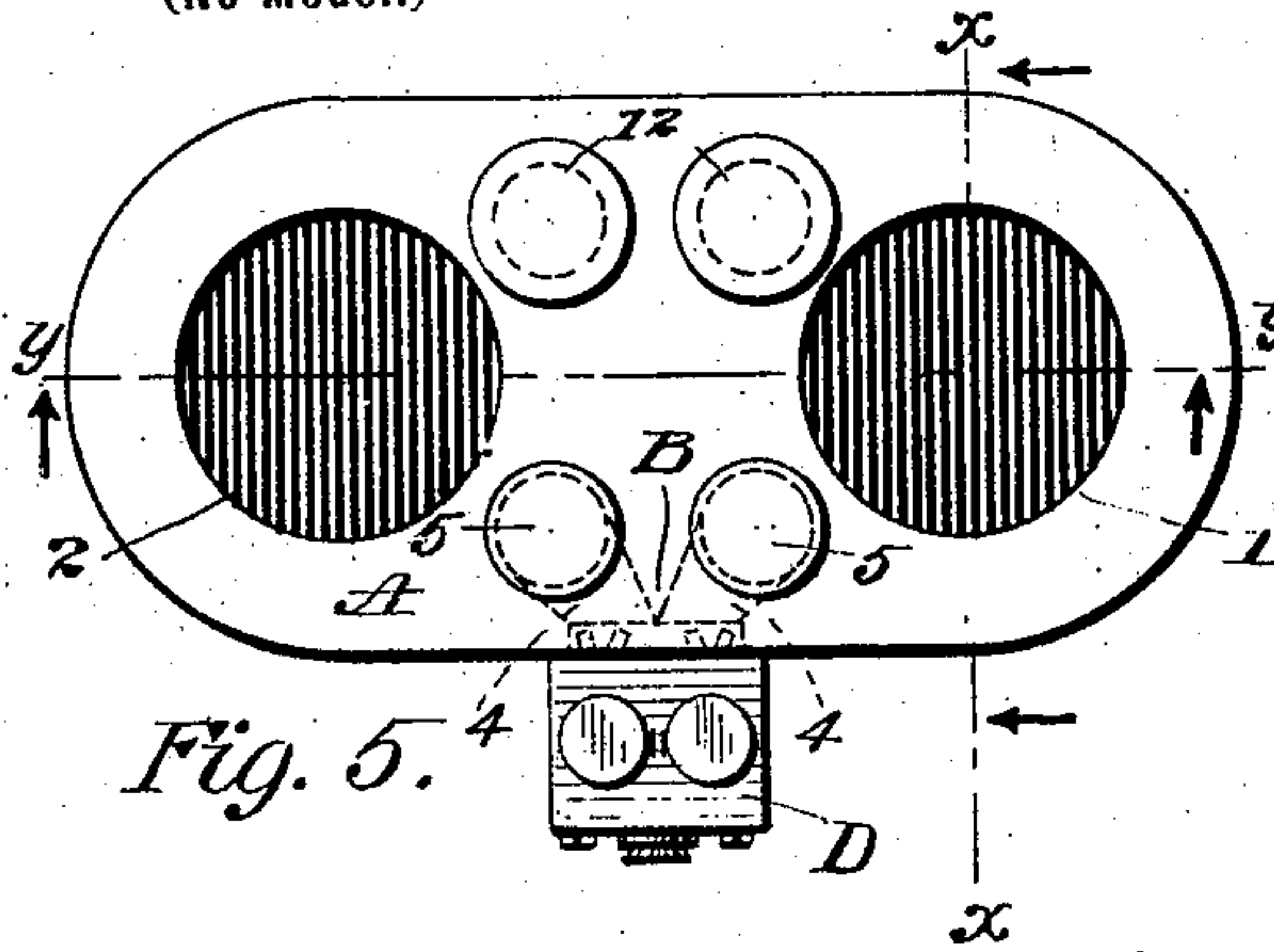


Fig. 5.

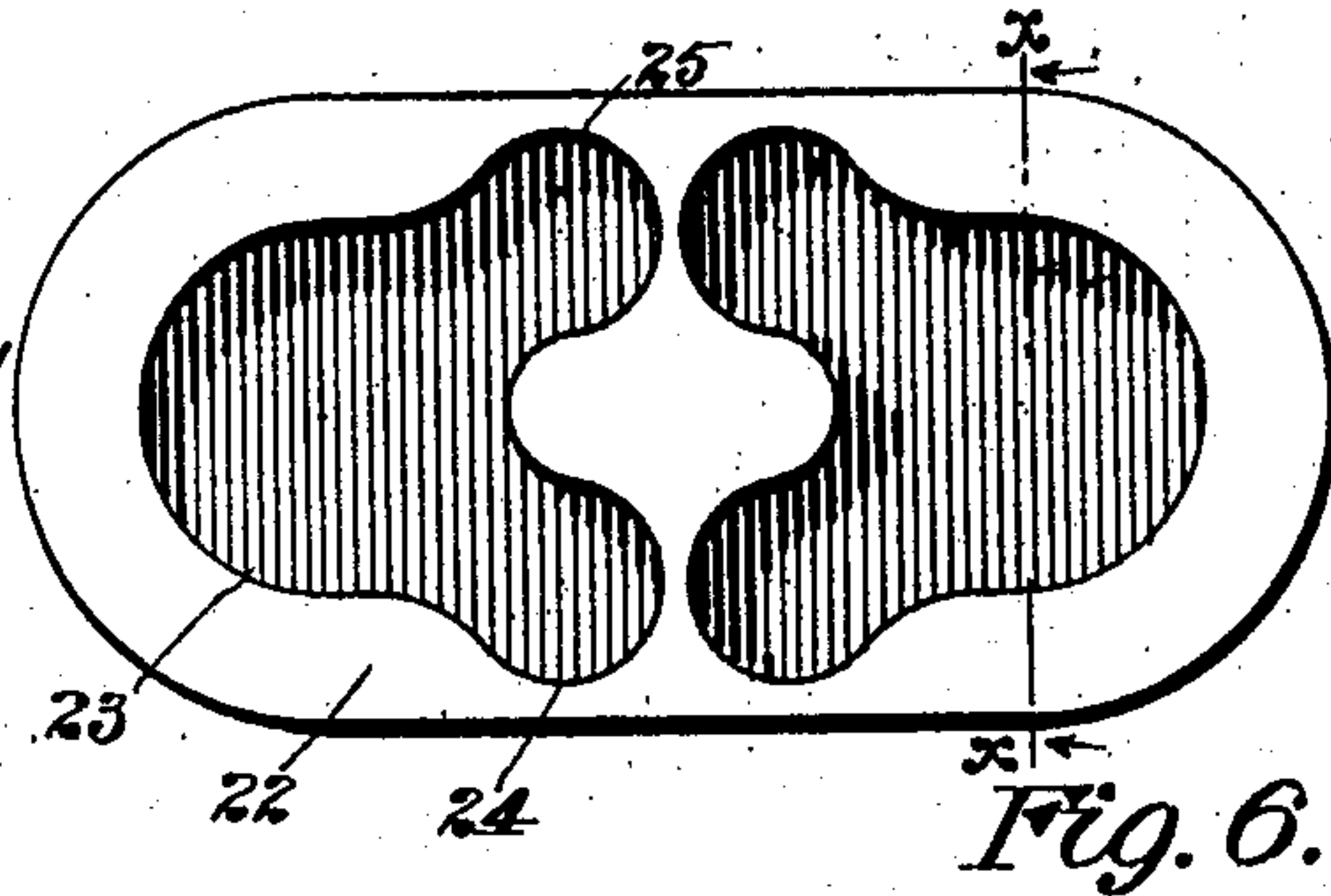


Fig. 6.

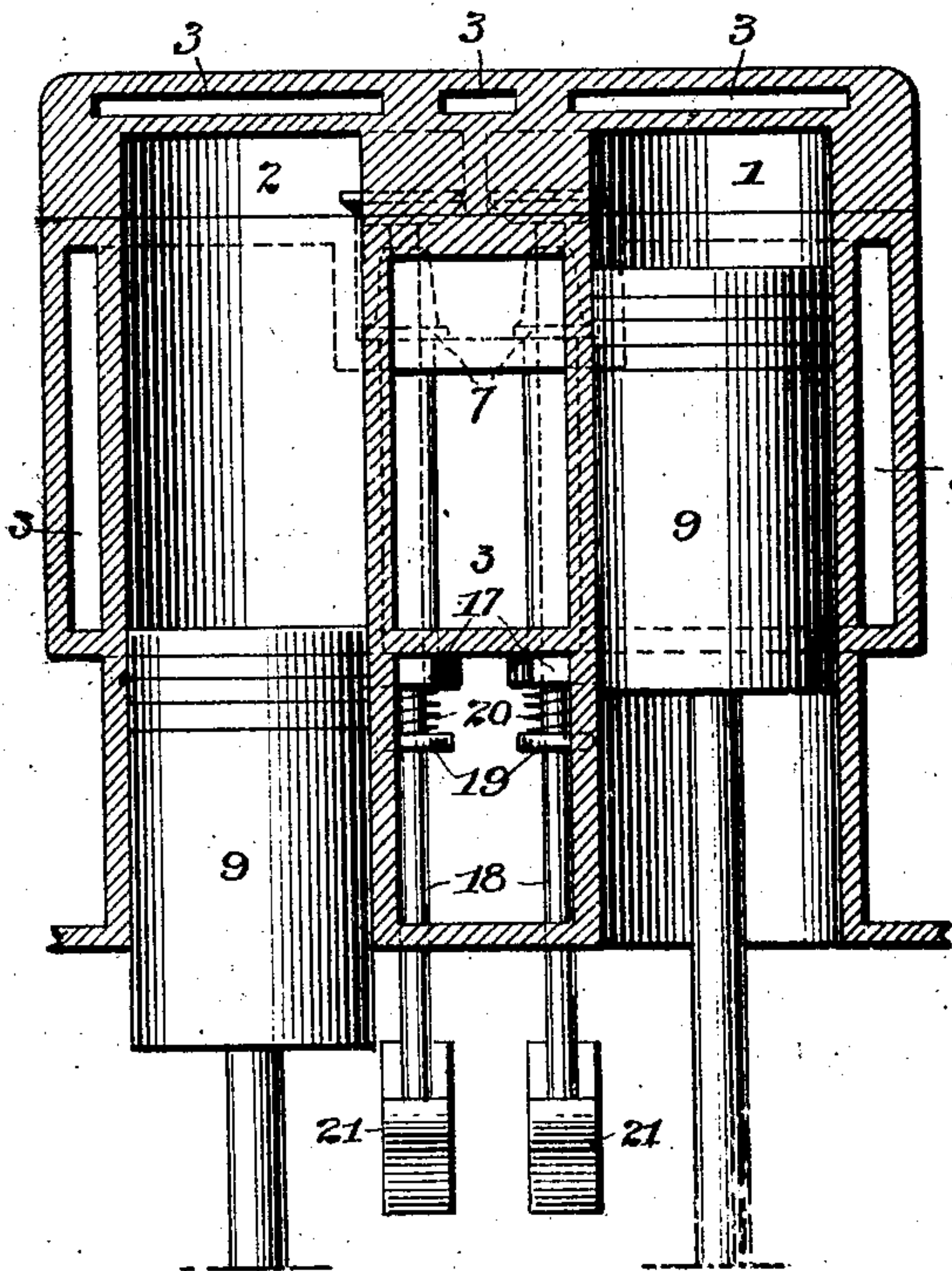


Fig. 7.

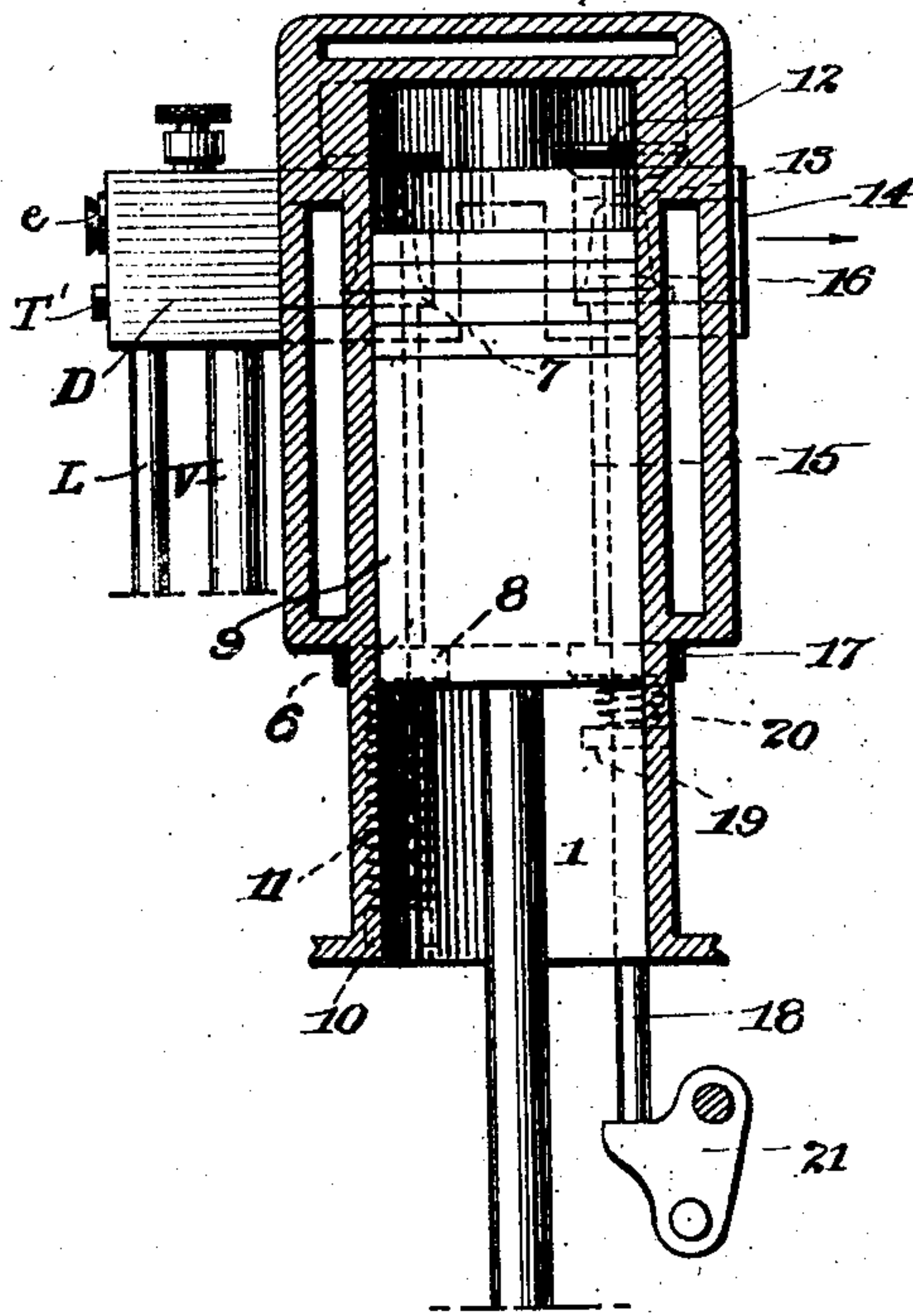


Fig. 8.

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UNITED STATES PATENT OFFICE.

CARL C. RIOTTE, OF NEW YORK, N. Y., ASSIGNOR TO THE C. C. RIOTTE COMPANY, OF NEW YORK.

VAPORIZER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 633,274, dated September 19, 1899.

Application filed June 21, 1898. Serial No. 684,091. (No model.)

To all whom it may concern:

Be it known that I, CARL C. RIOTTE, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Vaporizers and Gas-Engines, of which the following is a full, clear, and exact description.

My invention relates to vaporizers and gas-engines; and my special object is to improve the construction of the same and to provide a vaporizer which shall discharge directly into the cylinder-casing of the engine and shall require no regulation of the air-supply.

In the accompanying drawings, Figure 1 shows a horizontal sectional view through my vaporizer and through a broken-away part of the cylinder-casing of the engine. Fig. 2 shows a vertical sectional view of the vaporizer on the line X X, Fig. 1. Fig. 3 shows a vertical sectional view on the line Y Y, Fig. 1. Fig. 4 is a plan view of one of the screw-heads and retaining-spring. Fig. 5 is a plan view of the cylinder-casing with the head removed. Fig. 6 is a plan view of the cylinder-head, looking from beneath. Fig. 7 is a sectional view on the line Y Y of Fig. 5, looking in the direction of the arrows. Fig. 8 is a sectional view on the line X X of Figs. 5 and 6, the vaporizer being shown in elevation.

In the preferred embodiment of my invention as shown in the accompanying drawings, A shows a broken-away part of the cylinder-casing of the engine—in this embodiment a two-cylinder engine. Two openings C C' are provided, one leading into one cylinder and the other into the other, as hereinafter described.

The vaporizer proper in this embodiment consists of a casing D, having a fluid-chamber E and an air-passage F, separated by the partition G, which has a small vent E'. An opening from the air-passage is provided at H. This opening H is adapted to register with the openings C C' in the cylinder-casing.

K K are atomizers, each having in this embodiment four nozzles K', which extend substantially into the openings C C' and out of which the fluid to form the gas for the engine is drawn in the form of spray by the aspirating effect on the nozzles, resulting from

the suction of air past them, as described hereinafter.

L is a fluid-supply pipe.

M is an overflow-pipe, whose top is preferably level with the atomizer, as shown in Fig. 2, and inside of and preferably concentric with the supply-pipe L and leads any oil which may overflow into it away.

N are tubulures, preferably on the partition G and extending into the oil-supply chamber, as shown in Figs. 1 and 3.

n is a passage, preferably at the bottom of these tubulures, as shown in Fig. 3 in dotted lines, through which oil from the oil-chamber may pass to the hollow O in the tubulures and from thence up to an opening O', substantially on a level with the top of the oil-supply pipe, and from there to the atomizer and nozzle screwed or otherwise fastened therein.

V is an air-passage, through which air is preferably drawn by the backward movement of the piston in the cylinder and which air as it rushes past the nozzle K' exerts an aspirating effect upon them and draws out the fluid therefrom in the form of spray, which is at once vaporized.

T T are hollow lugs on the casing for the reception of bolts T' to fasten the vaporizer to the cylinder.

The cylinder-casing to which the vaporizer is preferably attached is shown in detail in Figs. 5, 6, 7, and 8. A is the casing, which incloses the cylinders 1 2, around which are water-jacket passages 3 3. The cylinder in which the piston moves preferably extends through the ends of the casing, as shown, and is closed by a cylinder-head hereinafter described. The cylinder-casing has vaporizing-passages 4 4 within the same, and in this embodiment below the upper surface thereof, as shown, which connect with the openings C C', toward which the atomizers are directed. A hole is bored from the top of the casing down into each of these vaporizing-passages, which is closed by a valve 5. 6 is a sleeve having a head 7, extending down through the cylinder and screw-threaded at its lower portion, upon which is the nut 8 to draw the same tightly into its seat. Within this sleeve is

carried the valve-stem 9, which has upon its upper end the valve 5 and on its lower end a collar 10, between which and the nut 6 is a light spring 11, preferably just strong enough to keep the valve 5 on its seat, but which allows the valve to instantly open whenever a partial vacuum is created in the cylinder by the backward stroke of the piston. Preferably on the other side of the cylinder are valves 12, which close exhaust-ports 13 and 14. These valves are preferably provided with sleeves, heads, and collars, substantially like those on the valves 5. A spring 20 is interposed between the nut 17 and the collar 19 of these valves 12, which is comparatively strong, so as to keep said valves firmly upon their seats excepting when the cam 21 strikes the lower end of the valve-stems 18 and raises them off their seats at the proper time. The cylinder-head 22 fits over the top of the cylinder-casing and is preferably provided with a recess 23 and extensions thereof 24 and 25, which fit over the valves 5 and 12, respectively, and in this way make connection between the vaporizing-passages 4 and said cylinder and between said cylinder and exhaust-ports 13, respectively.

It will be seen that in this embodiment of my invention the vaporizer is applied directly to the face of the cylinder and the fluid to be vaporized is discharged into a passage within the cylinder-casing and near the combustion-chamber, which is on this account kept extremely hot. This insures a quick vaporizing of the fluid, which when one of the valves 5 is raised passes out into the cylinder or combustion-chambers 12. It is a common defect in these engines for the parts immediately surrounding the points where the vaporizing takes place to become chilled on account of the loss of heat resulting therefrom, and consequently such vaporization is retarded. In this embodiment of my invention, however, this is almost entirely prevented, for the atomizer discharges directly into this hot vaporizing-passage and has only to pass the valve 5 to enter the combustion-chamber. This almost entirely prevents any cooling of the vapor.

The overflow construction keeps the oil at a certain level, so that it is supplied to the atomizer at a uniform rate.

P is a valve screw-threaded into the casing and having an actuating knurled head P', a shoulder R, and a conical projection S to regulate the flow of fluid to be vaporized, as shown.

The operation of this embodiment is as follows: Oil passes up through the tube L and rises to the level of the atomizer and is kept at this level by the overflow-pipe M. When the piston moves backward, (in Figs. 7 and 8 downward,) air is drawn in through the opening H into the passage 4 and draws in the form of spray a certain amount of oil out of the atomizer. This amount is regulated by the position of the screw P, carrying the valve

S. As soon as the piston starts to move backward a partial vacuum is produced ahead of it and the inrush of air resulting therefrom raises the valve 5 off its seat. As soon as the spray of fluid enters the hot passage 4 it is converted into vapor, and as the valve 5 is now off its seat it rushes out into the combustion-chamber or cylinder ready to be compressed on the return stroke of the piston and ignited in the usual or any suitable manner.

Of course it will be evident that a one-cylinder engine may be used and that then only one of my atomizers is necessary, and it will be evident that many modifications of this construction may be made without departing from the spirit of my invention.

It will be observed by my invention no regulation of the air-supply is necessary, as the piston draws in the requisite amount, and the only regulation necessary to be used in this embodiment is the regulation of the oil-supply, which can be accomplished by means of the screw P. In this way the amount of vapor supplied may be regulated by the oil-supply regulation alone.

What I claim is—

1. In a vapor-engine in combination, a cylinder-casing inclosing two cylinders, a pair of vapor-passages also inclosed by said casing and located near one end of the same and each connected with one of said cylinders said passages opening through one side of said casing close together, a vaporizer, applied directly to said casing over and covering said openings from said vapor-passages, having a pair of atomizing-nozzles, a fluid-supply connected therewith, each of said nozzles having a plurality of atomizing-points and extending into said casing and directed toward said vapor-passages, and an air-passage past each of said nozzles and connected with said vapor-passages to spray said fluid directly into said vapor-passages.

2. In a vapor-engine in combination a cylinder-casing inclosing two cylinders, a pair of vapor-passages also inclosed by said casing and located near one end of the same and each connected with one of said cylinders said passages opening through one side of said casing close together, a vaporizer, applied directly to said casing over and covering said openings from said vapor-passages, having a fluid-chamber, a pair of atomizing-nozzles connected therewith each of said nozzles having a plurality of atomizing-points, means to keep said fluid in said chamber substantially on a level with said nozzles, said nozzles extending into said casing and directed toward said vapor-passages, a fluid-inflow into said chamber and an overflow therefrom, and an air-supply passage past said nozzles and connected with said vapor-passages to spray said fluid directly into said vapor-passages, and a valve between said fluid chamber and nozzle to regulate the flow of fluid therefrom.

3. In a vapor-engine in combination, a cyl-

inder, a casing inclosing said cylinder, a vapor-passage located entirely within and at one end of said casing, said passage connected with said cylinder and opening through the side of said casing, an inlet-valve in said passage, a vaporizer attached directly to said casing and covering said passage, said vaporizer having a liquid-fuel compartment or tank, provided with a liquid-fuel supply, and an air-passage provided with an air-supply and connected to said vapor-passage, an atomizing-nozzle connected to said fuel-tank extending through said air-passage into said casing and directed along said vapor-passage, substantially as described.

4. In a vapor-engine in combination, a plurality of cylinders, a casing inclosing said cylinders, a vapor-passage located entirely within and at one end of said casing said passage connected with said cylinders and opening through the side of said casing, an upright partition between said passages, an inlet-valve in each passage, a vaporizer attached directly to said casing and over said passages, a liquid compartment or tank in said vaporizer and a liquid-fuel supply therefor, an air-

passage and an air-supply therefor, said air-supply being connected to said vapor-passages, a plurality of atomizing-nozzles connected to said fuel-tank and extending through said air-passage into said casing and directed along said vapor-passages.

5. In a vapor-engine in combination, a casing inclosing a cylinder, a vapor-passage located entirely within and at one end of said casing, said passage connected with said cylinder and opening through the side of said casing, an inlet-valve between said passage and cylinder, a vaporizer attached directly to said casing and covering said passage, said vaporizer having a liquid-fuel supply and an atomizing-nozzle connected to said fuel-supply and directed through said air-passage and into said casing to project said liquid fuel directly into said vapor-passage.

Signed at New York, N. Y., this 26th day of May, A. D. 1898.

CARL C. RIOTTE.

Witnesses:

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C. R. RADCLIFFE.