

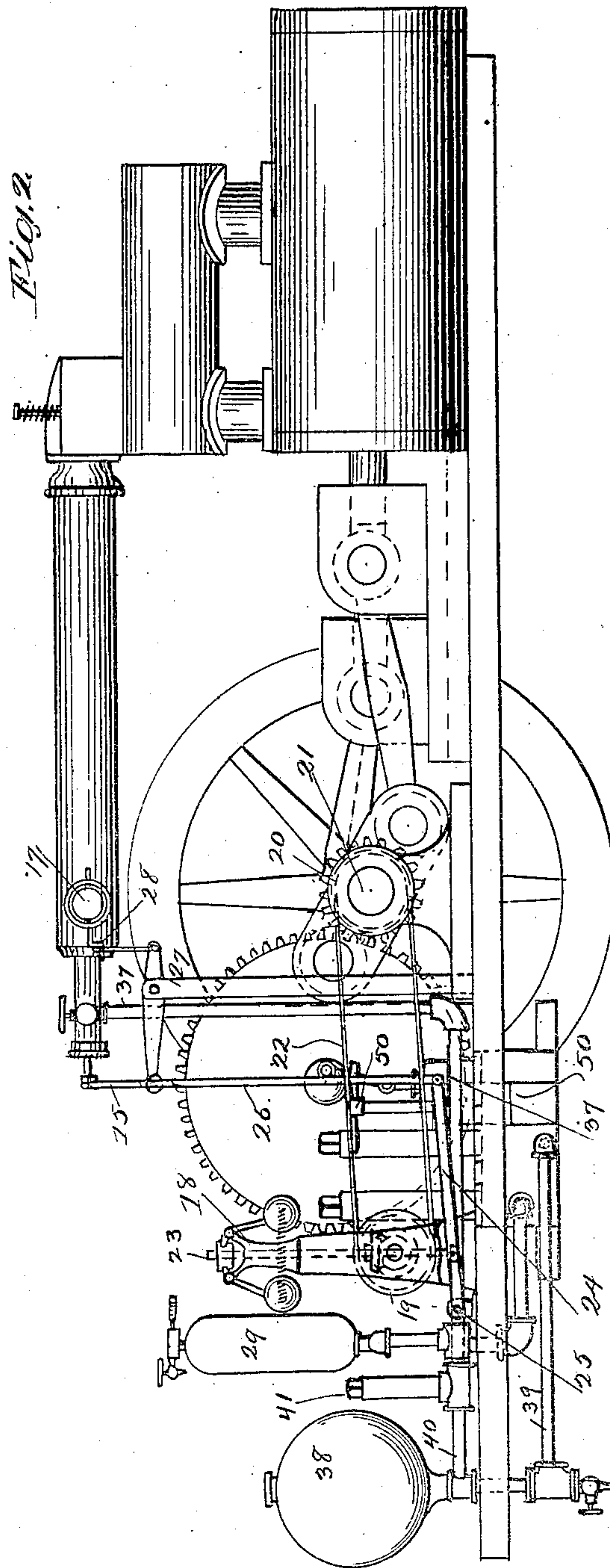
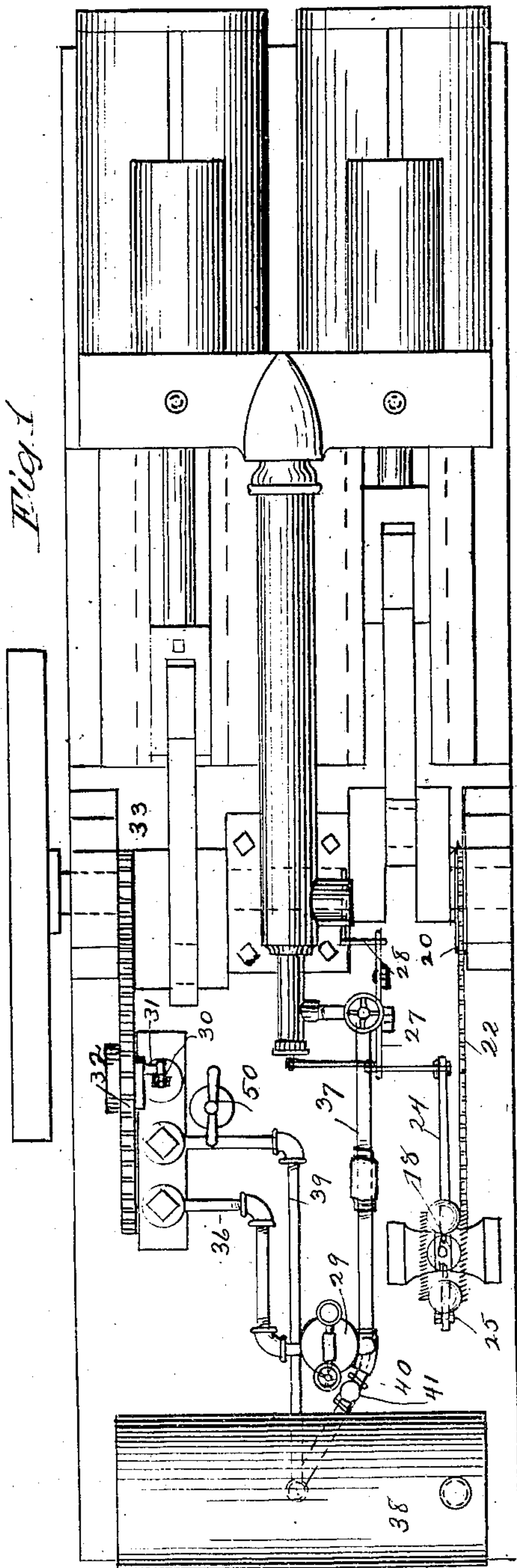
No. 883,981.

PATENTED APR. 7, 1908.

H. K. SHANCK.
GAS GENERATOR FOR EXPLOSIVE ENGINES.

APPLICATION FILED JAN. 23, 1906.

2 SHEETS—SHEET 1.



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Inventor
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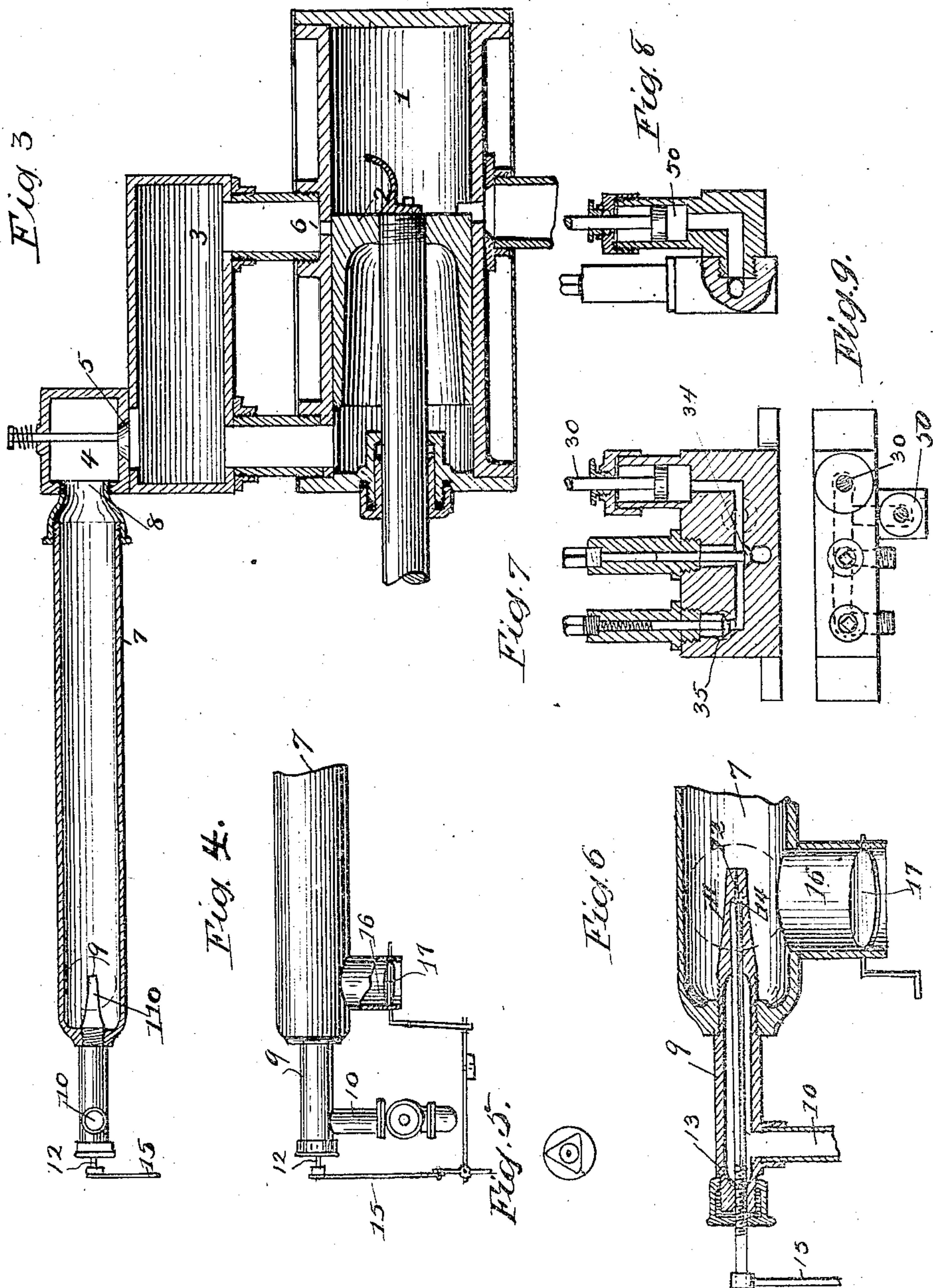
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UNITED STATES PATENT OFFICE.

HENRY K. SHANCK, OF CLEVELAND, OHIO, ASSIGNOR TO THE EUCLID MOTOR COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF SOUTH DAKOTA.

GAS-GENERATOR FOR EXPLOSIVE-ENGINES.

No. 883,981.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed January 23, 1906. Serial No. 297,423.

To all whom it may concern:

Be it known that I, HENRY K. SHANCK, a citizen of the United States, and resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Gas-Generators for Explosion-Engines, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of the invention are to provide a quick running or two cycle engine in which the exhaust containing the products of combustion shall be practically odorless owing to the perfect degree of combustion of the gases obtained.

The objects are also to obtain increased power and efficiency in the engine by supplying a more intimately commingled mixture of gas and air to the explosion chamber under pressure. This intimate mixture is produced not by inspiration of air or injector action nor by means of a carbureter of the ordinary type, but the fluid is forced through an exceedingly minute opening with a pressure of from 120 to 150 pounds, whereby it becomes a mere mist or vapor so that the air surrounding the jet is immediately incorporated therewith and the mixture is combustible to a degree unknown in dripping or sponge like carbureters where the explosive oil is merely atomized or provided in minute drops. For this reason a heavier and cheaper fluid can be employed in an explosion engine, such as a hydro-carbon or fluid rich in carbon such as benzin, without danger of incomplete combustion and consequent deposit of carbon on the sparking contacts, or disagreeable odor.

The invention consists in the elongated air and gas commingling chamber applied to an especial form of preliminary compression chamber as shown in my former application No. 166,233 and in the needle valve controlled inlet orifice for fluid, through which the fluid is projected longitudinally through the air and the chamber in the form of a mist.

It also comprises instrumentalities for automatically forcing the fluid through the minute annular opening in the valve at a

high degree of pressure, since by extreme pressure only can the fluid be forced through an opening thin enough to form the cloud or mist required for complete commingling with the air.

The invention also comprises instrumentalities for equalizing the pressure so as to make it continuous and instrumentalities for adjusting the supply of fluid and air to the commingling chamber to respond to the required speed and varying load upon the engine.

The invention also consists in the combination and arrangement of parts and construction of details as hereafter described, shown in the accompanying drawings and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of the device; Fig. 2 is a side elevation thereof; Fig. 3 is a vertical longitudinal section through the commingling chamber and one of the twin cylinders of the engine and also through the condensing chamber for that cylinder, and transverse passages leading to both commingling chambers; Fig. 4 is plan view of the outer portion of the commingling chamber showing the adjustment levers for the fluid and air valves; Fig. 5 is an end view of the fluid inlet nozzle; Fig. 6 is a longitudinal section (enlarged) of the outer end of the commingling chamber and fluid nozzle, showing needle valve, and air inlet, also the valve or damper in the air inlet; Fig. 7 is a vertical section showing the pump and valves by means of which the fluid is forced into the commingling chamber; Fig. 8 is a transverse section thereof and of a hand pump by which the initial pressure can be obtained before starting the engine; Fig. 9 is a plan view of the same.

The engine is shown as a multiple cylinder engine, having two working cylinders 1, 1, each of which is provided with a separate compression chamber 3, which chambers are connected by a trunk or passage 4, which conducts the charge to both of said chambers, communication between the latter and said trunk being controlled by spring-closed valves 5, opening toward said chambers. The chambers are connected to their respective cylinders by means of a port 6, the arrange-

ment being such that the compression stroke of the piston draws the charge from the trunk 4 into said chambers from which it passes into the cylinders through the ports 6, 6, when the pistons uncover the same on their outward or working stroke.

The commingling chamber is common to both cylinders in which the mixture is alternately used, and comprises the tube 7 entering the transverse passage 4, by means of a reduced inlet 8. In the outer end of this tube or chamber is axially placed the nozzle 9 provided with the lateral inlet tube 10 for oil. The nozzle 9 is tapered at 11 where it enters the chamber, and a long needle valve 12 controls a similarly tapered opening in the nozzle. The valve stem is threaded at 13 for minute adjustment and the valve is provided with a shoulder 14 by means of which all possible flow of oil can be shut off from the commingling chamber.

The long taper of the needle makes together with the screw the finest adjustment possible and the lever 15 upon the valve stem is designed to rotate only through a part of a circle, since the desired opening is so minute as to require extreme pressure to drive the oil through.

At one side of the chamber is the air inlet 16, controlled by means of the rotary valve 17.

To enable the fluid inlet and air controlling valves to operate in unison so that the requisite proportions of air and gas shall be maintained a governor 18 is employed to regulate their movements. This governor is operated by a sprocket or band wheel 19 connected with a similar wheel 20 upon the engine shaft 21, by means of the band or chain 22, and pivoted to the governor rod 23 is seen a lever 24 pivoted at one end to the engine bed 25 and at the other end to a link 26 which is connected directly to the lever 15 operating the valve stem in the oil inlet nozzle.

A rock arm 27 connects the lever 15 and a crank arm 28 of the axial rod of a disk valve which plays in the air inlet opening 16. The result is that the oil feed valve and air inlet opening will open and close together and thus feed oil and air in suitable proportions. The governor is not designed however to cut off all the oil at any time.

The pumping device is shown to consist of the reciprocating piston 30 operated by means of a crank pin 31 upon a gear wheel 32 moved in turn by a pinion 33 upon the engine shaft, the oil is raised past the valve 34, which prevents its return, and is forced past the spring pressed valve 35 and through the pipe 36 to an air chamber 29 the air in which is compressed as the oil enters, and which maintains the degree of pressure and also equalize it to produce a continuous flow.

Thence the oil passes through the pipe 37 to the commingling chamber.

38 is the oil reservoir, 39 the pipe leading therefrom to the pump, and 40 is an overflow pipe leading back to the reservoir and provided with the valve 41, which contains a spring and relieves excessive pressure.

The commingling chamber is shown to have a reduced extremity 8, and to lie horizontally in this manner providing a receptacle for overflow of oil in case a careless operator should leave the valve open for a long time, and in this manner the flooding of the engine will be prevented.

A hand pump 50 is used to obtain initial pressure upon the oil in the air chamber before the engine is started.

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

1. The combination in a quick speed explosion engine, of means for vaporizing the explosive fluid and for commingling the same with air to a predetermined degree, comprising an elongated tubular commingling chamber, a nozzle for the fluid at one end thereof arranged to discharge the fluid longitudinally of the chamber, a needle valve having a shoulder in said nozzle, means for obtaining a minute adjustment of said valve, a lateral air inlet in said chamber adjacent to said nozzle, a valve in said air inlet, a governor operatively connected with a rotating part of the engine, and coördinating instrumentalities for operating the valves of the fluid nozzle and air inlet whereby an unvarying proportion of air and fluid is obtained, said coördinating parts being operatively connected with and controlled by said governor, substantially as described.

2. In a fluid burning explosion engine, having a cylinder and inlet port and controlling valve therefor, in combination a commingling chamber having an inlet nozzle for the fluid arranged to discharge longitudinally of the chamber, a needle valve in said nozzle, an air inlet in said chamber arranged to permit air to intercept the stream of explosive fluid, a rotary valve therein, a governor operated by said engine, coördinating means for operating said fluid valve and air inlet valve conjointly to supply air and fluid in suitable proportion to the chamber and means for forcing fluid under pressure into said valve, comprising a fluid receptacle, a pump operatively connected with the engine, a pipe leading from said receptacle to said pump and thence to said nozzle, and an air chamber upon said pipe, substantially as described.

3. In an explosion engine employing an explosive fluid, a commingling chamber for air and gas, comprising, an elongated tube re-

duced in size at one end and having an air inlet, in combination with a fluid nozzle at the other end arranged to discharge into said chamber longitudinally of the latter, a needle
5 valve located inside the chamber at the other end of the latter adapted to minute adjustment, said needle valve having a shoulder cooperative with the opening in the nozzle to close the latter, and instrumentalities

for forcing fluid under pressure through the 10 attenuated opening in said valve, substantially as described.

In testimony whereof I hereunto set my hand this 12th day of January 1906.

HENRY K. SHANCK.

Witnesses:

WM. M. MONROE,
GEO. O. WILLET.