

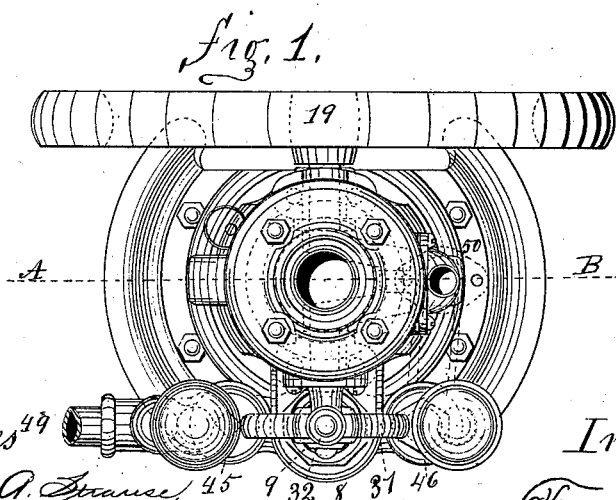
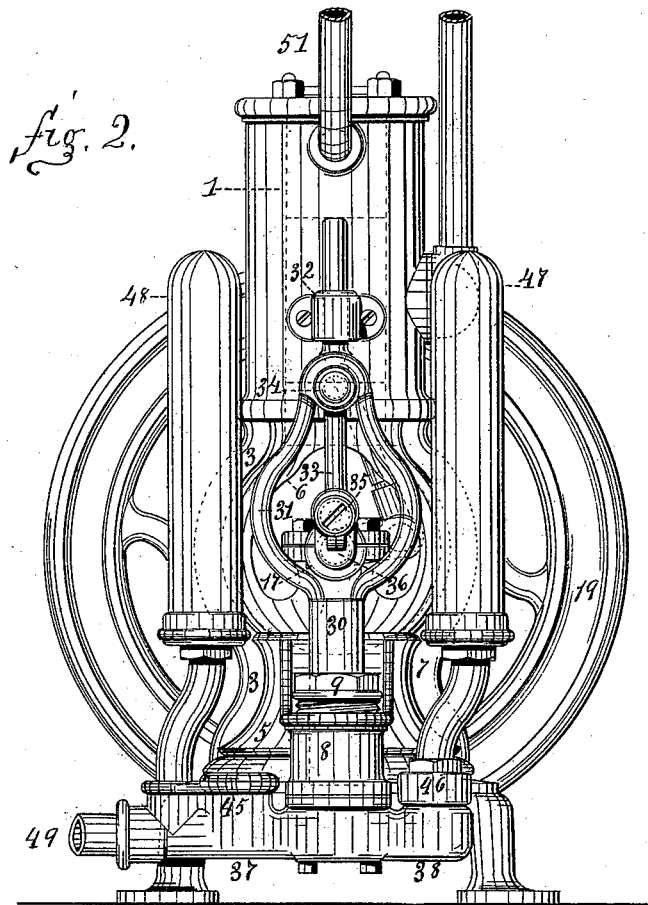
(No Model.)

2 Sheets—Sheet 1.

F. B. TAYLOR.
GAS ENGINE PUMP.

No. 347,137.

Patented Aug. 10, 1886.



Witnesses⁴⁹

Edmund A. Starnes,
A. S. Gautier

Inventor

Frederick Ballou Taylor

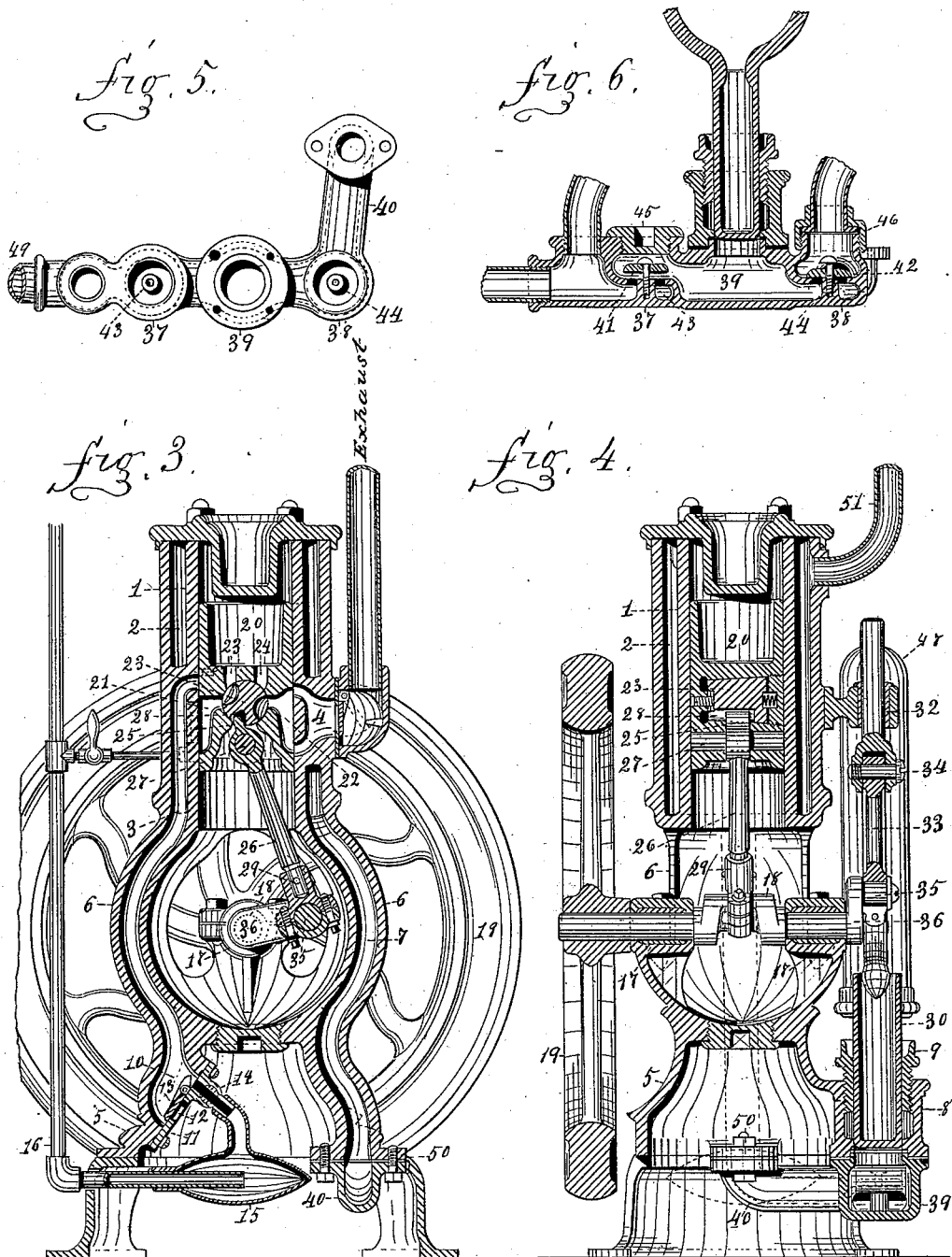
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UNITED STATES PATENT OFFICE.

FENNER BALLOU TAYLOR, OF WASHINGTON, DISTRICT OF COLUMBIA.

GAS-ENGINE PUMP.

SPECIFICATION forming part of Letters Patent No. 347,137, dated August 10, 1886.

Application filed March 11, 1886. Serial No. 194,775. (No model.)

To all whom it may concern:

Be it known that I, FENNER BALLOU TAYLOR, a citizen of the United States, residing at Washington, in the District of Columbia, have
5 invented certain new and useful Improvements in Gas-Engine Pumps; 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 ap-
10 pertains to make and use the same.

My invention relates to improvements in small gas-engine pumps to be employed in pumping water in dwellings or other build-
15 ings, chiefly in cities and towns where the water-pressure in the water-supply is insufficient to elevate it to a desired height.

The objects of my invention are, first, to supply a gas-engine pump of the simplest construction possible, compact, and occupying but
20 a small space; second, a gas-engine pump that can be afforded at a very low price, and withal durable and not liable to get out of order, entailing little or no expense in repairs, and requiring the least amount of attention.

By preference I make my gas-engine pump to work vertically, from the fact of its occupying less space than a horizontal one, and in its construction I make the bed-plate, vertical supports, and cylinder, together with the pump-
30 barrel and pillow-blocks, all in one casting, avoiding the expense of fitting and securing the parts together. The motor-cylinder is made with a water-jacket and open at both ends, the top being closed by a cylinder-head,
35 which is easily removed for the purpose of withdrawing and cleaning the piston and valve. In it is formed a passage for the introduction of the explosive gas-mixture, also an ignition and exhaust port, which are located
40 about midway in the length of the cylinder. The piston is of the trunk type, in which is arranged a conical valve connected by ports in the piston which register or communicate with the passage in the cylinder, and also with
45 the explosion-chamber above the piston. The connecting-rod is attached direct to the piston and crank, and by its vibrations, in connection with the revolutions of the crank, motion or oscillation is given to the valve by means
50 of a tooth or cam formed on the upper end

above the connecting-pin, and engaging with or working in a cam-shaped recess formed in the under side of the valve. The explosive mixture of air and gas is supplied to the motor-cylinder by means of an elastic rubber bag 55 and suitable valves located in a chamber in the base, and conducted by a side pipe formed in the base and cylinder-support leading to the passage formed in the cylinder, thence by the passages and ports in the piston and 60 valve into the explosion-chamber. The pump, in combination with the motor forming a portion of the machine, is a single-acting plunger-pump supplied with suitable suction and delivery valves and air-chambers driven direct 65 from the engine-shaft by a crank made thereon and connected to the plunger of the pump by a connecting-rod and yoke, the yoke forming the upper portion of the plunger and working vertically, the same as the motor portion 70 of the pump. The lower portion of the pump-barrel, the valve-chambers, and branch pipe are made in one piece, but separate from the upper portion of the pump-barrel, for the convenience of fitting, and is secured by bolts. 75 The delivery valve-chamber is connected with the water-space surrounding the motor-cylinder by the branch pipe communicating with a side pipe or passage formed in the base and cylinder-support, (but on the opposite side 80 from the gas and air supply,) through which communication and water-chamber the water is delivered by the pump, taking up the heat from the motor-cylinder in its passage, and conducted by a discharge-pipe to its destina- 85 tion.

To make my invention more clear and better understood, reference is made to the accompanying drawings, in which—

Figure 1 is a plan view; Fig. 2, an elevation 90 showing the general plan of construction and arrangement of the different parts; Fig. 3, a vertical section through the line A B, Fig. 1, showing the internal construction and arrangement. Fig. 4 is also a vertical section, but at 95 right angles to that shown in Fig. 3; and Figs. 5 and 6, plan and sectional views of the valve-chambers, wherein similar figures represent corresponding parts in all of the views.

1 is the motor-cylinder; 2, the water-cham- 100

ber surrounding it; 3, the passage to conduct the explosive mixture to the cylinder; 4, the exhaust-passage; 5, the base, and 6 the cylinder-supports, in which is formed the passage 3, for conducting the explosive mixture, and the passage 7, which conducts the water to the water-chamber 2 from the pump.

In connection with the base 5 is formed the pump-barrel 8, into which is screwed the stuffing-gland 9. In the base 5 is formed a mixing-chamber, 10, closed by a cover, 11, in which is an opening 12, through which passes the air-supply, and is closed by a flap-valve, 13, which is opened by the pressure of the atmosphere as it is drawn in by the action of the piston in the cylinder, and immediately closed by gravity as the pressure is removed, preventing the escape of the gas-mixture from the motor. In the cover 11 is also formed a valve, 14, for regulating the amount of gas to be admitted to form a proper explosive mixture.

15 is an elastic gas-bag, supplied by the pipe 16, the office of which is to afford a regular supply of gas.

17 are the pillow-blocks, 18 the crank-shaft, and 19 the fly-wheel.

The piston 20 is made longer than the stroke of the crank, in order to not uncover the passage 3 in the cylinder in its reciprocating motion, and chambered in its upper portion to reduce the weight, in the side of which in the lower half is formed a passage, 21, of sufficient length to register and communicate with the passage 3 in the cylinder during the time that the piston is performing the upper half of its stroke. At this point it passes and shuts off the passage 3 during the performance of the lower half of the downward stroke. A passage, 22, is formed, similar to the passage 21 in the opposite side of the piston, which communicates with the double exhaust-passage 4 during nearly the whole of the upward stroke of the piston.

The conical valve 23, which is arranged and fitted into a correspondingly-shaped recess in the piston, has a recess formed on each side, forming communication between the passages 21 and 22 in the piston and the ports 23 and 24 into the explosive-chamber, and adjusted in its seat by a tail-screw and held in position by a coil-spring. The oscillation of the valve produced by the cam 25, formed on the end of the connecting-rod 26, above the connecting-pin 27, working in the cam-shaped recess 28, forms alternately communication between the explosion-chamber and the induction and eduction passages. Ignition is produced in the ordinary manner by an external gas-flame, through a port in the side of the cylinder and piston, which register at the proper point for the explosion. The connecting-rod has a telescopic connection, 29, to facilitate the disconnection for withdrawing the piston.

30 is the pump-plunger, which is provided with a yoke, 31, supported at the top by the

guide 32. The connecting-rod 33 is hinged at its upper end to the yoke 31 at the point 34, and at its lower end to the crank-pin 35 of the crank 36, which, by preference, is made in one piece with the crank-shaft 18, by which means motion is transmitted to the plunger of the pump by the reciprocation of the piston 20.

The suction-valve chamber 37, the delivery-valve chamber 38, and the base of the pump, 39, are made in one piece together with the side or connecting pipe 40, for compactness and to avoid joints which are liable to derangement and leakage.

The valves 41 and 42 are made of vulcanized rubber, and the lift of which can be regulated by the adjusting-screws in the studs 43 and 44, and are accessible by removing the cap 45 and unscrewing the union-joint 46, which connects the air-chamber 47 to the delivery-valve chamber 38. The connections for the air-chamber 48 and suction-pipe 49 are made by a continuation of the valve-chamber 38.

Communication is made at the point 50 by the branch pipe 40 between the pump and the water-passage 7, leading to the water-chamber 2 and the discharge-pipe 51.

I am aware that prior to my invention gas-motors with trunk-pistons having conical valves operated by the vibrations of the connecting-rod and single-acting plunger-pumps have been in public use and are not new, none of which do I broadly claim; but

What I do claim as new and my invention, and what I desire to secure by Letters Patent, is—

1. In a gas-engine pump, the combination of a vertical gas-motor having an external water-chamber, 2, an induction-passage, 3, an exhaust-passage, 4, and a trunk-piston, 20, with a single-acting plunger-pump connected and communicating with the water-chamber 2 and discharge-pipe 51 by means of the connecting-pipe 40 and side pipe 7, formed in the base 5, and cylinder-support 6, all substantially as set forth.

2. In a gas-engine pump, the motor-cylinder of which having a trunk-piston, 20, with a conical valve, 23, the combination of the tooth or cam 25, formed on the upper end of the connecting-rod 26, working in the cam-shaped recess 28 in the under side of the valve and giving motion to the same, substantially as set forth and described.

3. In a gas-engine pump, the motor-cylinder, in combination with the side pipe 3, mixing-chamber 10, cover-plate 11, opening 12, flap-valve 13, and regulating-valve 14, in connection with the gas-bag 15, as arranged, substantially as set forth.

4. In a gas-engine pump having a pump-barrel, 8, formed in connection with the base 5, in combination with the removable base 39, valve-chambers 37 and 38, connecting side pipe 40, valves 41 and 42, air-chambers 47 and 48, and studs 43 and 44, with their regulating-screws, substantially as herein set forth.

5. The combination, in a vertical gas-engine pump, of the motor-cylinder 1, with its water-chamber 2, base 5, cylinder-supports 6, with their passages 3 and 7, the connecting-rod with the cam-shaped tooth 25, working in the cam-shaped recess 28 in the under side of the valve 23, actuating said valve, mixing-chamber 10, cover-plate 11, with its accompanying opening and valves, in connection with the gas-bag 15, pump-barrel 8, valve-chambers 37 and 38, valves 41 and 42, air-chambers

47 and 48, connecting-pipe 40, pump-plunger 30, with its yoke 31, and connecting-rod 33, connecting it with the crank 36, substantially as set forth, and for the purposes described. 15

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

FENNER BALLOU TAYLOR.

Witnesses:

E. A. STRAUSE,

A. S. YANTIS.