J. E. PATTERSON.

GAS ENGINE.

APPLICATION FILED AUG. 6, 1908.

913,156.

Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.

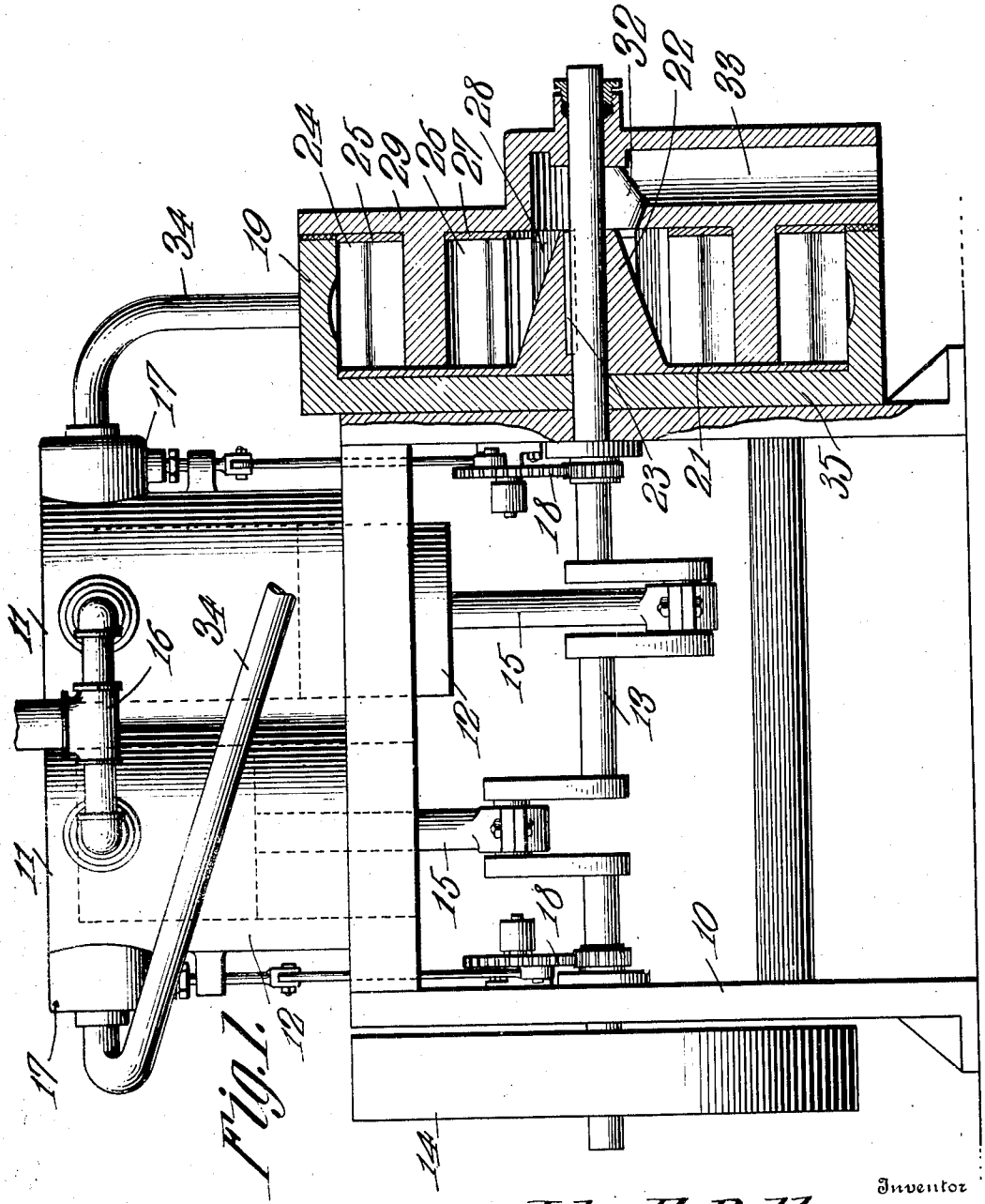


Fig. 1.

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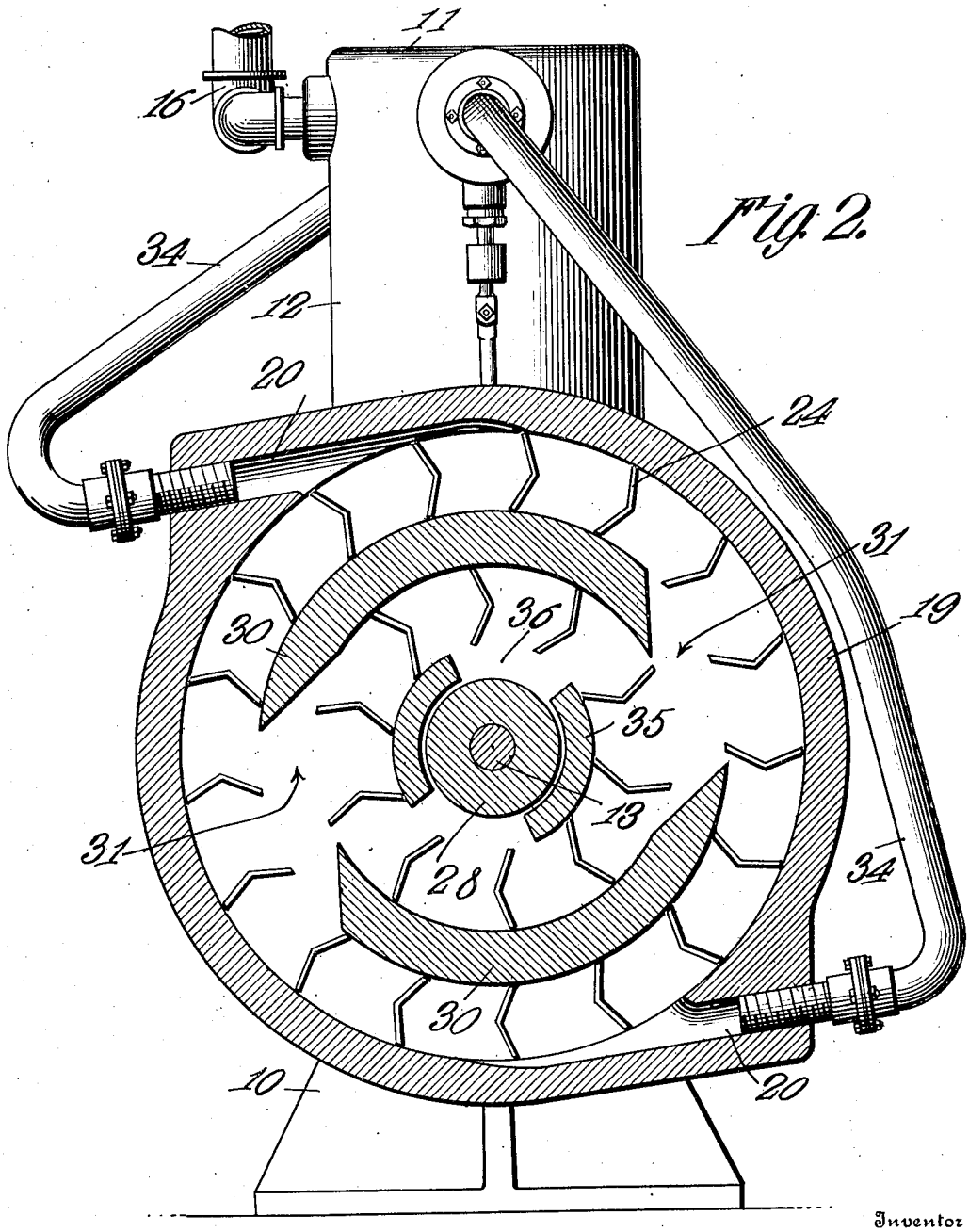


Fig. 2.

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UNITED STATES PATENT OFFICE.

JOHN E. PATTERSON, OF GAINESVILLE, TEXAS.

GAS-ENGINE.

No. 913,156. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed August 6, 1908. Serial No. 447,261.

To all whom it may concern:

Be it known that I, JOHN E. PATTERSON, a citizen of the United States, residing at Gainesville, in the county of Cooke and State of Texas, have invented a new and useful Gas-Engine, of which the following is a specification.

This invention relates to gas engines, with special reference to a gas engine provided with both reciprocating and rotary motor elements, the latter being of an improved construction.

One of the objects of this invention is to provide an improved motor for use in connection with gas engines, said motor being actuated by the exhaust from a reciprocating motor element.

Another object of the invention is to provide an improved casing for the motor arranged to minimize back pressure.

With the above and other objects in view the invention consists in general of an improved form of motor casing wherein is mounted an improved motor, the casing being in communication with the exhaust from a reciprocating motor element.

The invention further consists in certain novel details of construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the claims.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—Figure 1 is a side elevation of an engine constructed in accordance with this invention, the motor casing, cover and motor being shown in sections. Fig. 2 is a cross section taken through the rotary element and its casing.

The numeral 10 indicates the frame of the engine and upon this frame are mounted the cylinders 11. In the present instance two cylinders are shown mounted upon the frame but it is not intended that the number of cylinders shall be limited to two inasmuch as the device will work with any number of cylinders whatever. These cylinders may be of any preferred form of explosive motor cylinder, and may be arranged to operate on either the two cycle or four cycle type. It is preferred, however, that the cylinders shall be of such number and so arranged as to make a substantially continued exhaust, that is to say, where a two cycle type of reciprocating engine is used, at least two cylinders are preferable, while with the four cycle, at least four cylinders are best adapted to develop the full power of the engine. Each of these cylinders is provided with the usual reciprocating piston 12. A crank-shaft 13 is mounted in suitable bearings on the frame 10 and supports at one end a fly-wheel 14 which may if desired be used for conveying power to a pulley by means of a suitable belt. Piston rods 15 serve to connect the crank shaft 13 with the several pistons 12. At 16 is indicated the supply pipe for the combustible, and it is to be understood that this is merely typical of any such supply pipe in the same manner that the cylinders are typical of any explosive motor cylinders.

The valve arrangements for the supply pipe may be of any desired form and are not deemed necessary here to be shown as they form no especial part of this invention. At 17 are indicated the exhaust valve casings containing ordinary exhaust valves which are connected to the crank-shaft 13 by any suitable form of gearing as indicated at 18.

Mounted upon the frame 10 is a motor casing 19, this casing being arranged concentric to the axis of the crank-shaft 13. The casing 19 is provided with nozzles 20 preferably two in number oppositely disposed. It will be plain that where but one cylinder is used it will be necessary to have but one nozzle, and that where more than two cylinders are used a separate nozzle may, if desired, be used for each cylinder. Where more than two cylinders are used, however, it may, in some cases, be found advisable to connect the exhaust pipes so that but two nozzles will be used, and thus avoid undesirable complications of mechanism. The axes of these nozzles are arranged to lie in a circle of slightly smaller diameter than the inner periphery of the casing 19.

Within the casing 19 is held the motor which comprises a back plate 21 to which is rigidly attached a central frusto-conical hub 22 which is in turn fixed to the shaft 13 by means of a suitable key 23. Upon this back plate 21 is mounted a series of impeller blades or buckets 24 extending around the periphery of the back plate and provided with an annular ring or plate 25 which serves to connect and brace the outer ends of said blades. Spaced from this series of blades but concentric therewith is a second series of blades 26 in like manner provided with a bracing ring 27 connected to the free ends. This motor may be made of cast

metal if desired and the back plate, hub, both series of buckets and rings cast as a single piece, or it may be built of plates and cast metal riveted or otherwise fastened together, as may be best found expedient.

The inner series of blades 26 are spaced from the shaft 13 in such manner as to form an exhaust chamber 28.

The casing 19 is provided with an outer closure comprising a head 29 provided with rigidly connected inwardly extending arcuate flanges 30 spaced apart at their adjacent ends and arranged to lie between the two series of blades 24 and 26. The adjacent ends of these flanges or walls are so formed as to constitute an exhaust for the outer series of blades 24 and a nozzle for the inner series 26, this combined exhaust and nozzle being indicated by the numeral 31. It is to be noted that there will be one of these nozzles 31 for each of the nozzles 20 and that the exhaust nozzle 31 will be so positioned that each will lie in advance of the nozzle 20 to which is formed the complement. The head 29 is provided with a centrally disposed exhaust port 32 communicating with an exhaust passage 33 formed preferably on the exterior of the head. This exhaust passage may in turn be connected to an exhaust pipe if desired or may simply extend downward and exhaust into the atmosphere, as indicated in Fig. 1.

For the purpose of conducting the exhaust from the cylinders 11 to the motor casing nozzles 20, there are provided pipes 34 connecting the exhaust valve casings 17 with the nozzles 20, there being one of these pipes for each of the valve casings 17. Around the chamber 28 on the head 29 are other arcuate flanges 35, spaced at the ends to form exhaust ports 36.

In the operation of the device, when the piston 12 in one of the cylinders 11 is on the exhaust stroke, the exhaust gases will be forced out through the pipe 34 connected to that cylinder and through the nozzle 20 connected to the pipe. The gases then pass from this nozzle to the blades 24, thereby impelling the motor element until the exhaust port and nozzle 31 is reached. At this point the gases pass to the inner series of blades 26 and add another impulse to the motor element. From this series of blades the exhaust gases pass through the port 36 and into the exhaust chamber 28, thence passing out through the port 32 and passage 33. By means of this arrangement it will be seen that the motor obtains two distinct series of impulses and that when the gases pass out of the port 32 practically all of the power obtainable therefrom has been utilized.

It is obvious that minor changes may be made in the form and construction of this invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope thereof.

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

1. In a gas engine, a plurality of cylinders, a piston held to reciprocate in each of said cylinders, a motor casing having a pair of oppositely disposed nozzles formed in the wall thereof and a centrally disposed exhaust chamber in communication with the exterior of said casing, a cylinder exhaust pipe leading from each of said cylinders to one of said nozzles, a motor held in said casing, a series of blades on said motor adjacent the inner periphery of the casing, a wall concentric with the casing adjacent the inner ends of said blades and provided with a pair of oppositely disposed exhaust ports, a second series of blades on said motor concentric with the first series lying adjacent said wall, and a second wall provided with a pair of oppositely disposed exhaust ports lying between said second series of blades and the exhaust chamber.

2. In a gas engine, a pair of cylinders, a piston held to reciprocate in each of said cylinders, a motor casing having a pair of oppositely disposed nozzles formed in the wall thereof and a centrally disposed exhaust chamber in communication with the exterior of said casing, an exhaust pipe leading from each of said cylinders to one of said nozzles, a motor held in said casing comprising a back plate, a centrally disposed frusto-conical hub, a peripheral series of impeller blades, a ring connecting the outer ends of said impeller blades, a second series of impeller blades concentric with and located internally of the first series in spaced relation thereto, and a second ring connecting the free ends thereof; in combination with a wall concentric with the casing held between the first and second series of blades and provided with oppositely disposed exhaust ports, a second wall held between the exhaust chamber and the second series of blades provided with oppositely disposed exhaust ports, a frame whereon is mounted said cylinders and said motor casing, a crank-shaft supported in said frame, said crank-shaft passing through said frusto-conical hub and being keyed thereto, and piston rods connecting said pistons to said crank-shaft.

3. The combination with a multiple cylinder reciprocating engine, and its crank shaft; of a rotary motor operatively connected to the crank shaft of said engine, said motor having a series of inlets for the motive fluid, and said inlets being connected respectively to the exhausts of the engine cylinders.

4. The combination with a multiple cylinder internal-combustion engine, and its crank shaft; of a rotary motor operatively connected to the crank shaft, said motor having a series of inlets for the motive fluid, and said inlets communicating respectively with the exhausts of the internal combustion engine cylinders.

5. The combination with a multiple cylinder reciprocating engine, and its crank shaft; of an impact rotary motor operatively connected to the crank shaft, and nozzles discharging onto said motor, said nozzles communicating respectively with the exhausts of the engine cylinders.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN E. PATTERSON.

Witnesses:

WALTER C. NICHOLS, Jr.,

E. N. BLACKBURN.