J. A. BAAB.

GAS ENGINE.

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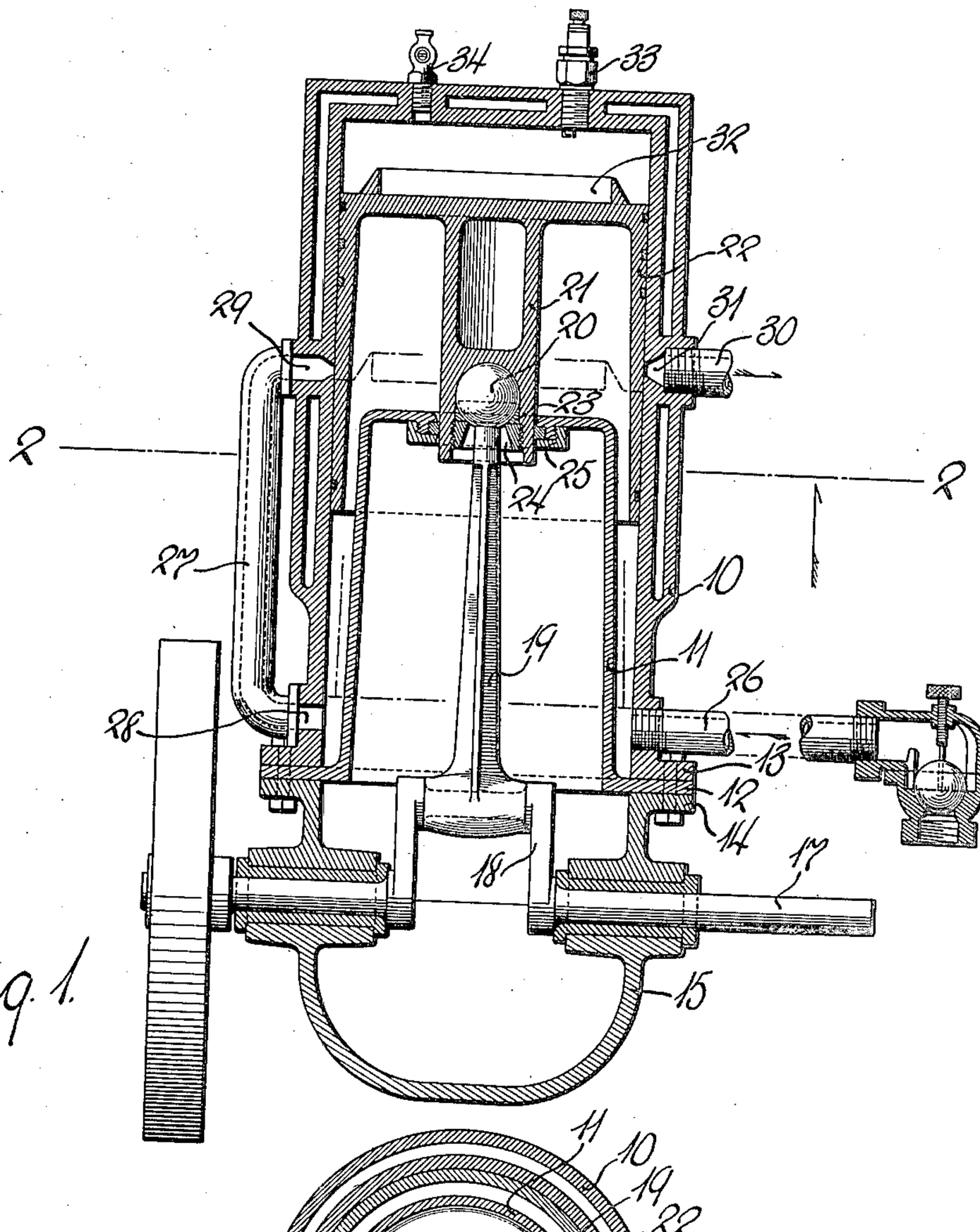

Fig. 1.

Fig. 2.

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GAS-ENGINE.

958,211. Specification of Letters Patent. Patented May 17, 1910.

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To all whom it may concern:

Be it known that I, JACOB A. BAAB, of the city, county, and State of New York, have invented a new and useful Improvement in Gas-Engines, of which the following is a full, clear, and exact description.

My invention relates to improvements in gas engines, and the object of my invention is to produce a simple form of gas engine which will show a higher efficiency and better economy than the ordinary explosive engine.

Generally in explosive engines the gases are compressed in the crank casing and more or less gas escapes around the crank bearings and casing joints, so that the volume passed into the explosive part of the cylinder after each piston stroke, is not always sufficient, and in any event it takes several strokes of the piston to get the proper compression. Moreover with the usual type of piston engine the piston travels in a fixed line and so eventually there is a good deal of wear in certain points on both the piston and its cylinder. In my invention, however, I employ an auxiliary cylinder or casing which is arranged within the main cylinder and over which the piston slides, this auxiliary cylinder inclosing a part of the piston and the engine pitman and forming a relatively small chamber in which the gases are compressed before exploding. By this arrangement I am enabled to get the proper degree of compression at each piston stroke, and I can arrange the parts so that a good volume of gas is injected into the cylinder above the piston at each stroke of the latter. Moreover, in my improved engine I connect the pitman and piston by a ball joint arranged in such a way that the piston turns around and around on its axis and so does not wear in any one particular spot. I also use in connection with the foregoing improvements a deflector which causes the gas to be thrown well up into the cylinder and which does not interfere with the exhaust of the engine.

In the drawing I have shown my invention as applied to a two cycle gas engine.

Reference is to be had to the accompanying drawing forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a vertical section of the engine showing my improvements, and Fig. 2 is a sectional plan on the line 2—2 of Fig. 1.

The engine has a cylinder 10 which is substantially of the usual kind and may be of any preferred type, the drawing showing the usual water jacketed cylinder, and within this is an auxiliary cylinder or casing 11 which extends upward within the main cylinder and which can be secured in any convenient way so as to make a gas tight connection between the inner cylinder or casing and the outer cylinder. I have shown a convenient means in which the inner cylinder 11 is provided with a base flange 12 which is secured between the flange 13 of the cylinder 10 and the flange 14 of the crank casing 15. The manner of securing the cylinder 11 is not, however, important, but the essential thing is to have the casing or cylinder extend well up within the main cylinder so as to form a relatively small but sufficient compression chamber between the piston and the cylinder or casing 11.

I have shown the engine provided with the ordinary crank shaft 17 having a suitable crank 18 connecting by a pitman 19 with the stem 21 on the inner side of the piston 22. The connection between the pitman 19 and stem 21 is by means of a ball joint, and I do not limit my invention to any particular form of ball joint but, as shown, the pitman 19 has a ball 20 at the end fitting into a corresponding cup with a socket in the stem 21 where it is held by the concave washer 23 and nut 24. The stem 21 slides through a suitable stuffing box 25 in the upper end of the cylinder or casing 11.

The inlet to the cylinder 10 is as usual through a pipe 26 near the lower part of the cylinder, which pipe connects with a suitable source of supply for the explosive mixture, the connection being usually to a carbureter or mixing valve. The inlet pipe 26 should be provided with a suitable check valve, preferably a ball valve as at 26ª, to prevent the gas from being forced back through the inlet pipe. The outlet for the compressed gas is also from the lower part of the cylinder 10, through a port 28 and

pipe 27, and the latter delivers through the port 29 to the upper part of the cylinder 10, when the piston 22 has reached the downward limit of its stroke and has exhausted. The exhaust is through a pipe 30 and port 31, as usual.

In the top of the piston 22 is a deflecting ring 32 which is inclined on the outer side, and this comes opposite the inlet port 29 when the piston is at the downward limit of its stroke as shown by dotted lines in Fig. 1. This causes the inrushing gas to be deflected to the upper part of the cylinder 10 so as to provide for an effective explosion. The ring deflector 32 does not interfere with the exhaust which passes out from the port 31 and pipe 30.

I have shown the cylinder 10 provided with the ordinary sparker 33, and obviously any sparking device can be used. I have also shown the cylinder provided with a petcock 34 as is customary. The important thing in the invention, however, is the gas tight auxiliary casing or cylinder 11, which forms a chamber between itself and the piston 22, and the ball connection between the piston and the pitman 19, as by these two things I get a small gas tight compression chamber and provide for an even wear on the piston and its cylinder.

Attention is called to the fact that in the downward stroke of the piston in my gas engine, nine-tenths of all gas compressed in the chamber between the piston and the inner cylinder is forced above the piston to be compressed again before exploding, whereas in the usual type of crank case compression one-third of the gas only is used at each stroke of the piston.

It is obvious that the particular arrangement of the ports and the construction and connections of the cylinder and other parts, can be altered considerably without affecting the principle of the invention.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a gas engine, the combination with a crank case, a shaft and piston operative therein, an outwardly turned flange on said crank case, an upwardly extending shell-member having an outwardly turned flange mounted upon the outwardly turned flange of said crank case, said shell-member having a flattened top, of a cylinder having an outwardly turned flange mounted upon the outwardly turned flange of said shell member, a contracted chamber between said shell-member and said cylinder, a piston operative within said cylinder and adapted to compress gas in said contracted chamber, and a downwardly projecting stem formed within said cylinder and adapted to slide through an aperture in the flattened top of said shell-member, said stem rotatably secured to said piston rod.

2. In a gas engine, the combination with a cylinder, outwardly turned flanges on the edge of said cylinder, a crank case, outwardly turned flanges on the edge of said crank case, and a shell member having outwardly turned flanges interposed between said crank case and said cylinder, said shell member having a flat top with an aperture therein, of a piston operative between said shell member and said cylinder, an integral, cylindrical extension depending from said piston, said extension adapted to slide through the aperture in the top of said shell member and having a recess in its lower end, and a piston rod having one end loosely secured in said recess whereby said piston is free to rotate.

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