C. J. JAHNKE.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JULY 13, 1915.

1,204,447.

Patented Nov. 14, 1916.

2 SHEETS—SHEET 1.

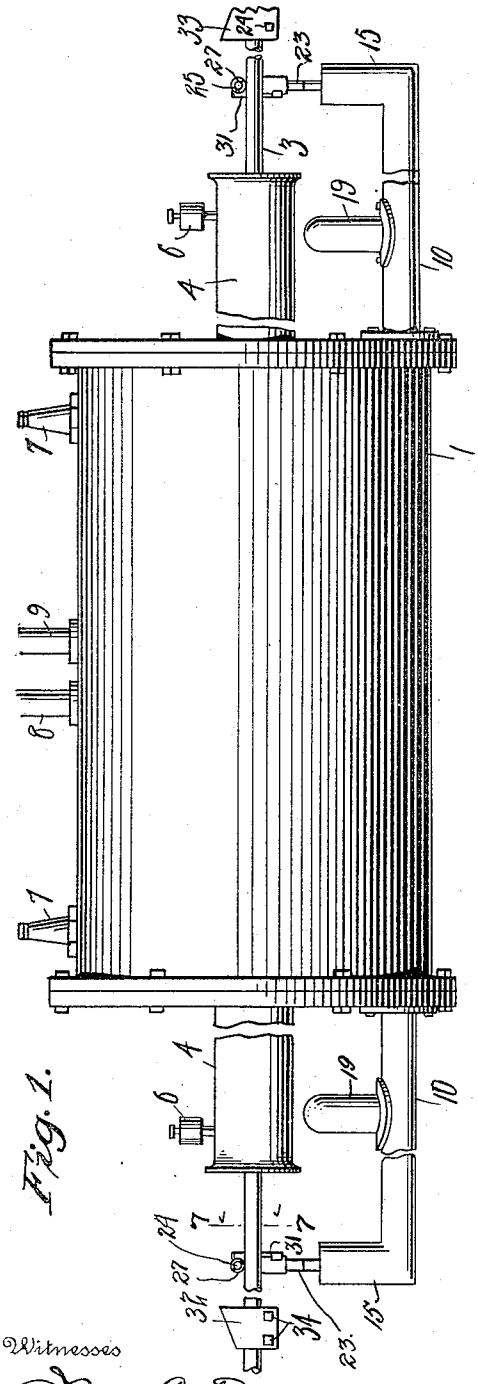


Fig. 1.

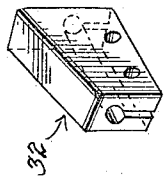


Fig. 4.

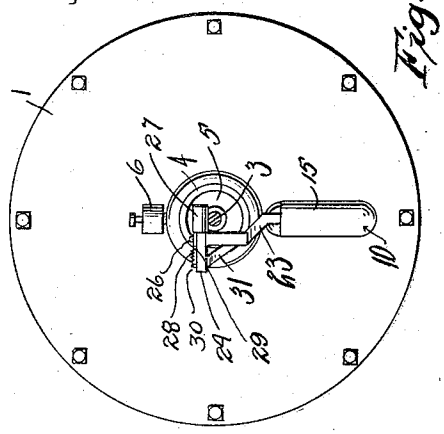


Fig. 5.

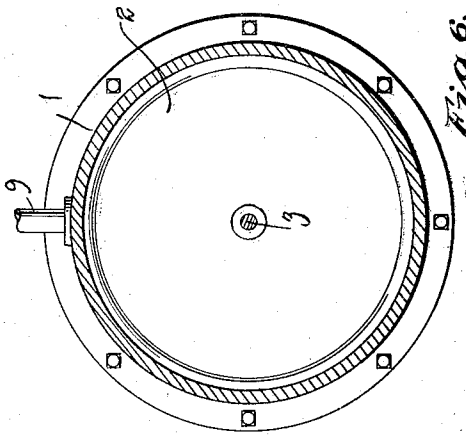


Fig. 6.

Witnesses

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2 SHEETS—SHEET 2.

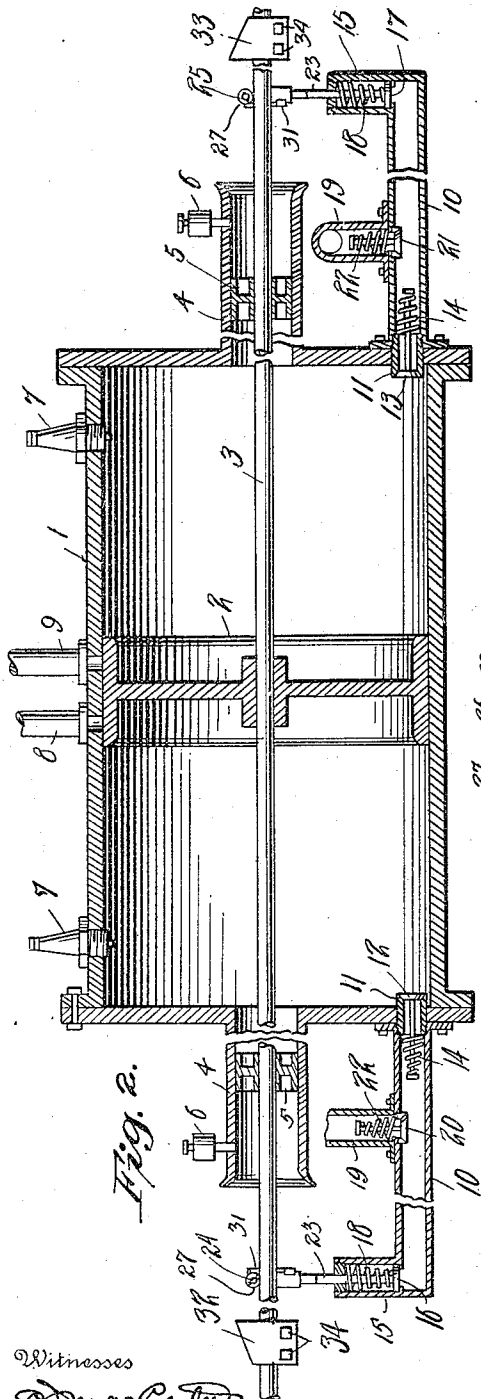


Fig. 2.

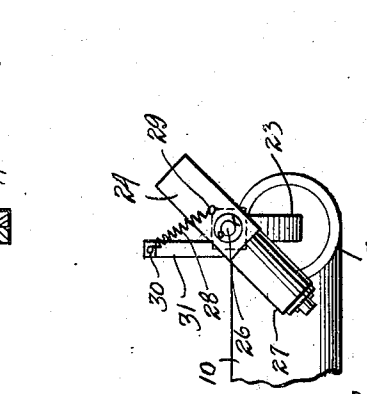


Fig. 8.

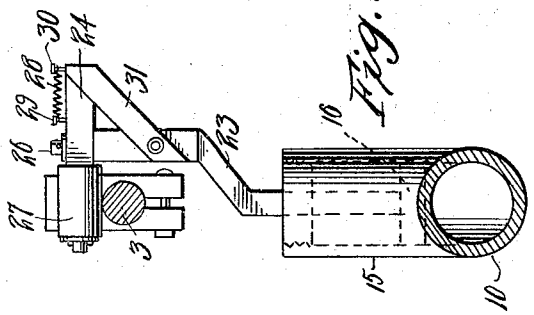


Fig. 7.

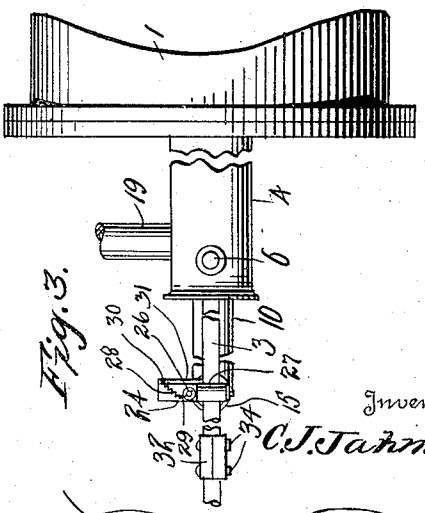


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

CHRISTIAN J. JAHNKE, OF BANCROFT, NEBRASKA.

INTERNAL-COMBUSTION ENGINE.

1,204,447. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed July 13, 1915. Serial No. 39,714.

To all whom it may concern:

Be it known that I, CHRISTIAN J. JAHNKE, a citizen of the United States, residing at Bancroft, in the county of Cuming, State of Nebraska, have invented certain new and useful Improvements in Internal-Combustion Engines; 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 appertains to make and use the same.

This invention relates to an internal combustion engine.

An object of the invention resides in the provision of a device wherein one cylinder is used and an impulse is given to the piston as it reaches each end of the cylinder.

A further object of the invention resides in the provision of novel means for injecting gas into the cylinder.

With these and other objects in view, such as will appear as the description progresses, my invention resides in the combination and arrangement of parts as set forth in and falling within the scope of the appended claim.

Referring to the drawings: Figure 1 is a side elevation of my device; Fig. 2 is a vertical sectional view; Fig. 3 is a fragmental plan view; Fig. 4 is a perspective view of one of the actuating cams; Fig. 5 is an end elevation; Fig. 6 is a vertical transverse sectional view; Fig. 7 is a section on line 7—7 of Fig. 1; and Fig. 8 is a fragmental detail showing the position of one of the valve arms when it is swung to allow the cam to pass.

Referring to the drawings by reference characters wherein like parts are indicated by like characters throughout the several views: In the drawing I have illustrated a cylinder 1 in which is operable a piston 2. The rod 3 of this piston extends outwardly from both sides thereof through the heads of the cylinder 1 and through tubular guide members 4 which are formed integrally with the cylinder heads. Secured to this rod 3 in each of the tubular guides 4 is a slide 5 which moves within the tubular member and keeps the rod 3 properly alined. Oil cups 6 are provided for properly lubricating the slides 5. The cylinder 1 is provided with spark plugs 7 which are located adjacent the ends thereof so that one will be to each side of the piston. This cylinder is further provided with exhaust ports 8 and 9 which are arranged in slightly spaced relation at the top of and adjacent the middle of the cylinder.

In order that the cylinder may be supplied with gas, I have secured a pipe 10 to each of the cylinder heads which communicates with the cylinder and is provided with a valve seat 11. Valves 12 and 13 are mounted in these valve seats and open inwardly into the cylinder 1. They are normally held closed by coil springs 14. The ends of the pipes 10 are turned upwardly as at 15 and have plungers 16 and 17 mounted therein which are normally held in their lowermost positions by springs 18. Gas supply pipes 19 are secured to the pipes 10 and communicate therewith and are provided with valves 20 and 21 which are normally held closed by springs 22 and open inwardly into the pipes 10. The rods 23 of the plungers 16 and 17 extend upwardly to one side of the piston rod 3 and have arms 24 and 25 pivotally mounted on trunnions 26 formed on the upper ends thereof. These arms extend across the piston rod 3 and are provided with rollers 27. The arms are normally held in position by coil springs 28, so that they will extend at right angles to the rod 3. The springs 28 are secured to pins 29 upon the arms and to pins 30 upon stop members 31 which stop members are secured to the plunger rods 23. Secured to the piston rod 3 at the ends thereof are cams 32 and 33 which are adapted to cooperate with the arms 24 and 25 to raise the plungers 16 and 17. These cams are secured in place by suitable bolts 34.

In operation when the piston 2 is moved toward one end of the cylinder and we will assume for convenience that it is moved toward the left end of Fig. 2, the port 9 will be opened and the gases which have been previously exploded in the right end of the cylinder will be exhausted through this port 9. When the piston moves to this position the straight face of the cam 33 will engage the roller on the arm 25 and move the arm about its pivot into a position similar to that shown in Fig. 8. When the cam has passed the said roller, the arm will be pulled into a position across the piston rod by the spring 28. At this time the valves 13 and 21 and the plunger 17 will be in their closed and lower positions, respectively. When the piston starts its return movement, caused by the explosion in the right end of the cylin-

der 1, the roller 25 will ride on the cam 33 and the plunger 17 will be raised against the tension of the spring 18. This raising of the plunger will open the valve 21 and draw gas into the pipe 10. When the roller 25 reaches the end of the cam, however, it will drop abruptly, under the action of the spring 18. This will force the plunger 17 downwardly and the gas will be forced out of the pipe 10 into the cylinder 1, the valve 13 being unseated. The entrance of the gas into the cylinder 1 occurs simultaneously with the closing of the port 9 and is very rapid so that the gas may be compressed upon the further movement of the piston. After the charge has been fired by the spark plug 7, the piston 2 will move in the opposite direction and the valves on the opposite end of the cylinder will operate in a manner similar to the operations just described. Thus it will be seen that the piston will be given an impulse upon reaching each end of the cylinder.

From the foregoing description it will be seen that I have provided a double acting engine in which novel means is provided for supplying the cylinder with gas.

While I have illustrated and described a particular embodiment of my invention, it has merely been for the sake of convenience and I do not wish to be limited to that particular embodiment as it is obvious that numerous changes may be made within the scope of the appended claim.

What I claim is:—

In an internal combustion engine, the combination with a cylinder having a piston operable therein, of a rod secured to said piston and extending outwardly through the head of the cylinder, a pipe connected to and communicating with the cylinder, a gas inlet for said pipe, a plunger mounted in the pipe and having an upwardly extending rod, an arm pivotally mounted on the upper end of the plunger and extending over the piston rod, a cam secured to the piston rod and adapted to engage the said arm to raise the plunger rod, and resilient means for forcing the plunger in the opposite direction.

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

CHRISTIAN J. JAHNKE.

Witnesses:
J. T. BAUMANN,
B. J. FISCHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."