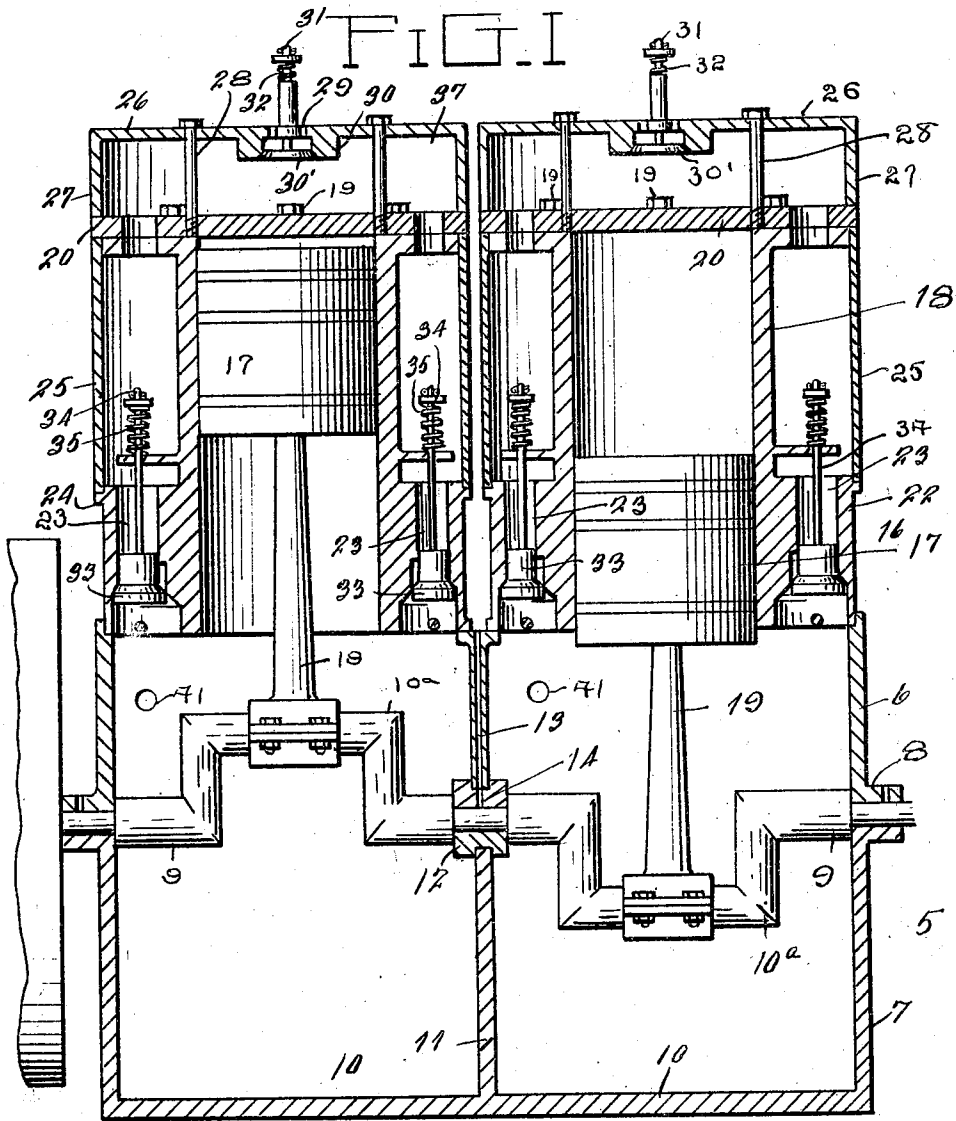


F. C. STRUKE.  
 GAS ENGINE.  
 APPLICATION FILED APR. 14, 1915.

Patented Aug. 14, 1917.  
 2 SHEETS—SHEET 1.

1,237,119.



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Witnesses

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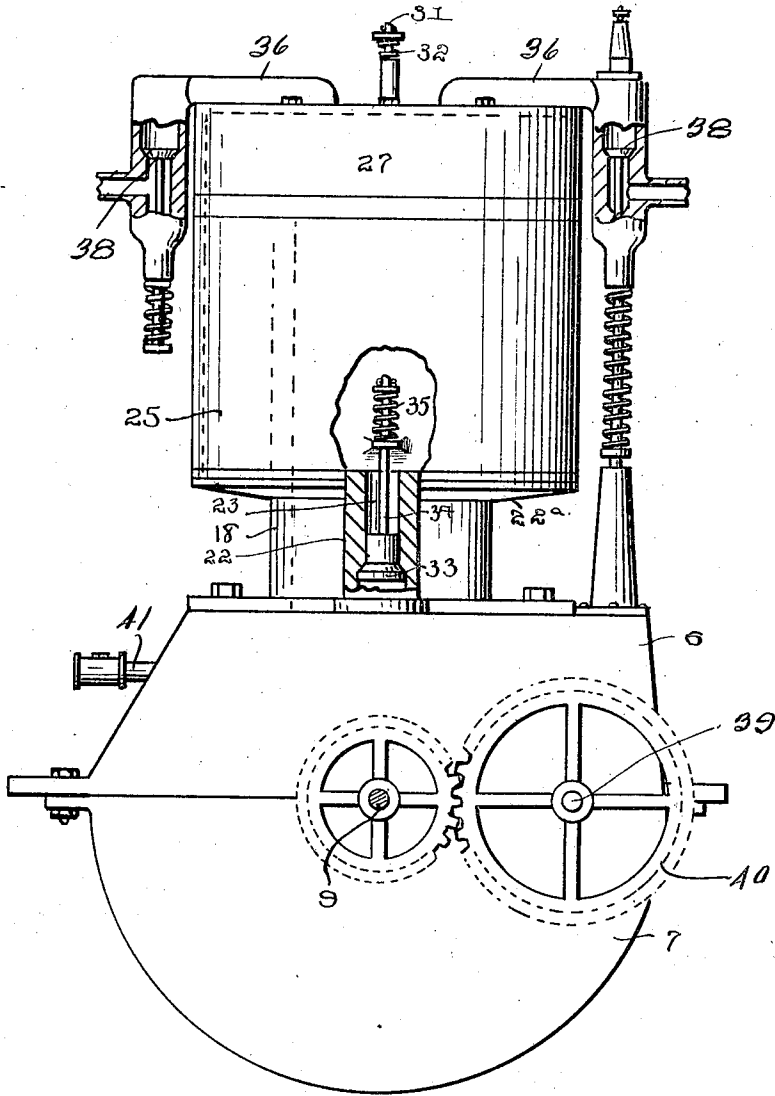
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2 SHEETS—SHEET 2.

FIG. 2



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# UNITED STATES PATENT OFFICE.

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## GAS-ENGINE.

1,237,119.

Specification of Letters Patent. Patented Aug. 14, 1917

Application filed April 14, 1915. Serial No. 21,386.

*To all whom it may concern:*

Be it known that I, FREDERICK C. STRUKE, a citizen of the United States, residing at Chicago Heights, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas-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 engines of the internal combustion type, and has for its principal object to provide a simple and efficient air cooled engine of this character.

Another object is the provision of an air cooled engine in which the air is circulated about the engine cylinder by the reciprocatory movement of the piston.

Another object is to provide an engine including an air chamber inclosing the cylinder through which air is drawn and discharged into the crank case during the movement of the piston.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts as will be hereinafter specifically described, claimed and illustrated in the accompanying drawing, in which:

Figure 1 represents a vertical sectional view through the improved gas engine constructed in accordance with this invention taken in the plane of the crank shaft.

Fig. 2 represents an end elevation of the engine, partly in section.

Referring to the drawing in detail, wherein similar reference numerals designate corresponding parts throughout the several views, the numeral 5 indicates the crank case of the engine, which is preferably formed in two parts, designated respectively by the numerals 6 and 7, the parts being suitably secured together and provided with bearings 8 rotatably supporting the opposite extremities of the crank shaft 9 having cranks 10<sup>a</sup> corresponding in number to the number of cylinders. The crank case is divided into a plurality of chambers 10 in each of which is located a crank 10<sup>a</sup> by a partition 11 having a central aperture receiving a bearing 12 in which is rotatably supported the central portion of the crank shaft 9. The portion of the partition 11 carried by the upper section or part 6 of the crank case is formed

with a vertical opening 13 communicating with an aperture 14 formed in the bearing or bushing 12 for conducting oil to the bushing and crank shaft.

The cylinders, designated generally by the numerals 16, are secured to the top section 6 of the crank case upon opposite sides of the partition 11. The pistons 17 are slidably mounted within the central portion or body 18 of the cylinders and are connected with the crank pins 10<sup>a</sup> by connecting rods 19. Cylinder heads 20 are secured to the upper open ends of the cylinders 18 by bolts 19, or equivalent means.

Each cylinder communicates at its lower end with one of the chambers 10 in the crank case 5 and is formed adjacent its lower extremity with a pair of diametrically opposed enlargements or bosses 22 having vertical passages or ports 23 formed therein also communicating with the chamber 10. An annular flange 22<sup>a</sup> is formed integral with each cylinder 18 adjacent the lower end thereof on which is supported a sleeve or casing 25 arranged in spaced relation to the cylinder 18 and engaged at its upper end with the flange 21 of the cylinder 18.

A crown or cap 26 is positioned upon the cylinder head 20 and is retained in spaced relation thereto by a depending flange 27. The cap 26 is reliably secured to the cylinder head 20 by bolts 28, or equivalent means, and is formed centrally with a plurality of intake ports 29 inclosed by an internal flange 30 formed integral with the cap. The inner extremity of the flange 30 is internally flared to provide a seat for an inwardly opening valve 30 including a stem 31 and a spring 32 coiled about the stem to normally retain the valve in closed position. The passage of air through the openings or ports 23 is controlled by a plurality of valves 33 provided with stems 34 on which are coiled springs 35 normally retaining the valves 33 in closed position.

Each of the cylinders 18 is connected with inlet and exhaust pipes 36 extending through the air chambers 37 between the cylinder heads 20 and the caps 26, and the passage of fuel and the products of combustion from the engine through said pipes is controlled by valves 38 operated by a cam shaft 39 connected with the crank shaft 9 by a train of gears 40 or other suitable valve operating mechanism.

While the engine illustrated in the accompanying drawing illustrates but two cylinders, it will be understood that as many cylinders may be provided, and the engine may be of any cycle preferred.

In operation, the pistons 17 are reciprocated within the cylinders 18 by the explosion of the gaseous fuel in the explosion chambers, and upon the upstroke of the pistons, a vacuum is created in the chambers 10 and air is drawn through the ports 29, chambers 37, ports 23 and into the crank case 5, thus thoroughly circulating fresh air about the cylinders 18. The succeeding down stroke of the piston 17 expels a quantity of the air contained within the chambers 10 through an air exhaust pipe 41, in which is preferably arranged a check valve, the valves 30 and 33 automatically closing under the influence of the springs 28 and 35, respectively.

What I claim is:

1. In an internal combustion engine, a hollow crank case, a cylinder secured to and communicating with said crank case, integral opposed enlargements formed on the lower end of said cylinder and having ports therein, a flange adjacent the lower end of said cylinder, a casing supported on said flange and secured to the end of said cylinder and arranged in spaced relation to the latter to provide an air space communicating with said ports, a head secured to the upper end of said cylinder and overlying said casing, said casing and head having communicating apertures therein, normally closed valves arranged in said ports, a hollow top secured to said head and having an

air inlet port in the upper end thereof arranged to direct air adjacent the head and through said communicating apertures and said casing, and means for controlling the flow of air through said inlet port, and an air exhaust pipe connected with said crank case.

2. In an internal combustion engine, a hollow crank case, a cylinder secured to and communicating with said crank case, integral opposed enlargements formed on the lower end of said cylinder having ports communicating therewith, a flange adjacent the lower end of said cylinder, a casing supported on said flange and secured to the end of said cylinder and arranged in spaced relation to the cylinder to provide air spaced valves arranged in said ports, an outwardly extending guide arm formed on said cylinder and extending into said casing and having an aperture therein, an upwardly extending valve stem slidably mounted in said aperture, a spring coiled around said valve stem and secured to the top thereof and resting on said guide arm to normally hold said valves closed, a head secured to said cylinder and overlying said air casing, said head and casing having communicating apertures, a cap fitted over said head, an air inlet port arranged in the central portion of said cap, and means controlling the flow of air into said port.

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

FREDERICK C. STRUKE.

Witnesses:

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OTTO HOFFMAN.