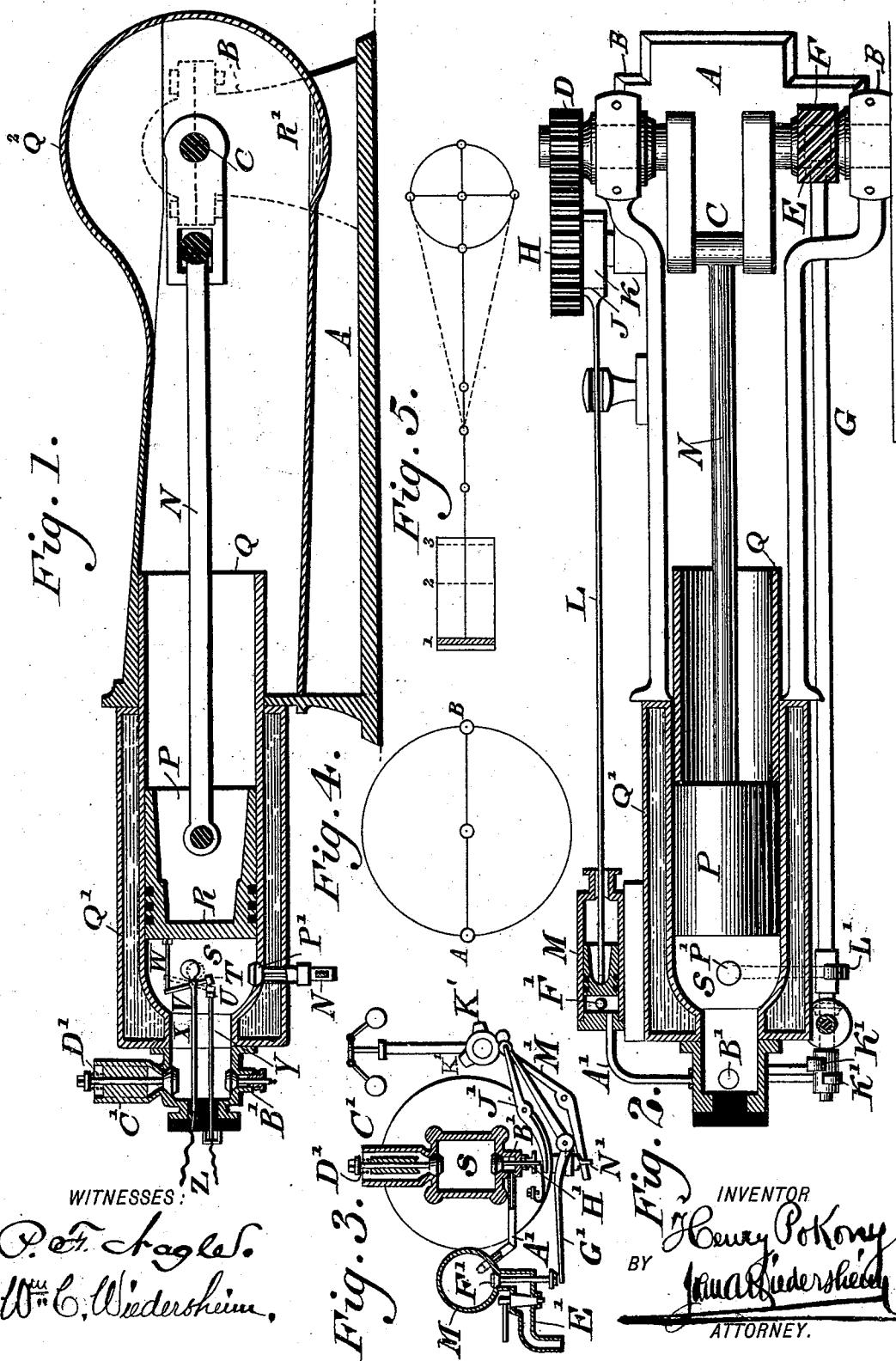


(No Model.)

H. POKONY.
GAS ENGINE.

No. 514,271.

Patented Feb. 6, 1894.



UNITED STATES PATENT OFFICE.

HENRY POKONY, OF PHILADELPHIA, PENNSYLVANIA.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 514,271, dated February 6, 1894.

Application filed June 23, 1892. Serial No. 437,682. (No model.)

To all whom it may concern:

Be it known that I, HENRY POKONY, a subject of the Emperor of Austria-Hungary, having resided in the United States one year last past and declared my intention of becoming a citizen thereof, at present residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Gas-Engines, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in gas engines and consists of the novel combination and arrangement of parts hereinafter set forth.

Figure 1 represents a longitudinal vertical section of a gas engine embodying my invention. Fig. 2 represents a horizontal section thereof. Fig. 3 represents a transverse section thereof. Figs. 4 and 5 are diagrams illustrating the operation of the engine.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings:—A designates the base of the engine on which are supported the standards B, which form the bearings for the crank shaft C, one end of said shaft carrying a pinion D, and the other end carrying a worm E, which latter meshes with a worm wheel F, which is secured to a rod G, whereby rotary motion is imparted to said rod.

The pinion D meshes with a gear wheel H, which is mounted on one of the standards or adjacent portions of the frame of the engine, and carries an eccentric J, shown in dotted lines Fig. 2, said eccentric being encircled by a yoke K, with which is connected a rod L of the gas pump M.

N designates a connecting rod of the crank shaft C and piston P of the engine, said piston being of cup shape closed at one end as R, and movable in a cylinder Q.

S designates a chamber in the end of the cylinder Q, on the side next to the closed end of the piston P, and within the same, are two electric contact points T and U, the point T being connected with a weighted arm V, and being normally held in contact with said point U.

Connected with the piston P, is a rod W, which is adapted to strike the rod V for purposes to be hereinafter explained.

The bearing rod X of the arm V, and the supporting rod Y of the contact U, are each provided with a wire Z, which are connected with a suitable battery, and thus an electric circuit may be formed when the points T and U are in contact.

A' designates a pipe which is connected with the pump M and a valve B', the latter being in communication with the adjacent portion of the chamber S. Connected with said chamber is an air valve C', which opens inwardly so as to admit air to said chamber, and closes outwardly by the action of a spring D', which is suitably affixed to the valve stem and a proper portion of the shell of said valve C'.

Connected with the barrel of the pump M, is a pipe E', whereby gas may be supplied to said pump. Intermediate of said pump and supply pipe is a valve F', whose stem is engaged by a lever G', whereby said valve may be opened.

The stem H' of the valve B' is adapted to be engaged by a lever J', the free ends of said levers G' and J' being in the path of cams or projections K' secured to the rod G, said rod having also the cam or projection L', which is adapted to engage with a lever M', which latter is connected with a stem N' of the exhaust valve P', which latter opens into the chamber S, said levers G', J', and M', being properly mounted on the frame of the engine.

The portion of the engine around the crank-shaft is inclosed by a casing Q', the lower portion R' of which constitutes an oil receptacle into which a portion of the crank shaft with which the piston rod N is connected is caused to dip into said bottom R', and thus be lubricated.

The diameter of the gear wheel H which carries the eccentric J, is twice that of the pinion D on the crank-shaft C, and the diameter of the worm-wheel F twice that of the worm E, so that there will be two revolutions of the said crank-shaft to one of said wheel H and worm-wheel F, and the eccentric J and yoke K are so arranged that on every instroke of the piston P, the piston of the gas pump has completed an instroke.

The operation is as follows:—On the outstroke of the piston P a partial vacuum is created in the cylinder, whereupon the valve

D' is automatically opened, admitting air into the chamber S. The instroke of the piston compresses the air in the cylinder, while during the first half of the said instroke, the piston 5 of the pump M compresses the gas until the valve B' is opened, when during the remainder of said instroke the gas is forced under compression through the pipe A' and valve B' into the chamber S. On the completion of 10 this instroke of the piston, the points T and U are separated, causing the gas to explode, thereby driving outward the piston, thus making its working outstroke. On this working outstroke the valve D' remains closed, and 15 there is no inlet of air. On the return stroke of the piston the exhaust valve P' is opened and the products of combustion discharged from the chamber S. On the next outstroke, the air-valve is again opened, and the air 20 drawn in as first stated. It will be noticed that the gas is forced into the chamber at the latter part of every second instroke of the piston P, and then under pressure being compressed during the first part of said stroke, 25 owing to the valve B' being closed during that time. It will also be noticed that the exhaust of the products of combustion from the chamber S, is by every second instroke of the piston P, and alternate with the instroke that 30 compresses the air therein.

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

1. A gas engine having a cylinder with a 35 gas chamber and a piston therein, a crank-shaft connected with the stem of said piston, a gas pump with a pipe leading to said gas chamber, a controlling valve for said pipe, mechanism substantially as described connected with said crank-shaft and the piston of the gas pump for imparting one-half the 40 number of strokes to said gas pump piston as to said cylinder piston, said gas pump piston completing its instroke on the completion of 45 every second instroke of the cylinder piston, an automatic air inlet valve for said gas chamber, and an exhaust valve for said gas chamber, said parts being combined substantially as described.

50 2. A gas engine having a cylinder with a gas chamber therein, provided with an auto-

matically-operating air-inlet valve and an exhaust valve, a piston in said cylinder, a crank shaft to which the rod of said piston is secured, a pinion on said shaft, a gas pump 55 having a pipe with a controlling valve leading to said gas chamber, and a piston with rod eccentrically connected to a gear wheel meshing with said pinion, said gear wheel being twice the diameter of the said pinion, and said gas pump piston completing its instroke at every second stroke of the cylinder piston, said parts being combined substantially as described.

3. A gas engine having a cylinder with a gas chamber therein, a gas pump having a 60 pipe leading to said chamber and provided with a controlling valve, a piston in said cylinder, a crank-shank with a pinion and worm thereon, a rotary gear wheel having twice the diameter of said pinion meshing therewith, a 65 piston in said gas pump eccentrically connected with said gear wheel so as to complete its instroke on every second instroke of the cylinder piston, a rotary rod carrying a worm wheel gearing with said worm, and cams on 70 said rod engaging said gas pipe valve and exhaust valve, said parts being combined substantially as described.

4. A gas engine consisting of a cylinder with a gas chamber therein having an automatically-operating air-inlet valve, a gas pump with pipe leading to said chamber and having a controlling valve therein, a piston in 80 said cylinder, a crank shaft connected with said piston and provided with a pinion, and 85 a worm thereon, a piston in said gas pump having its rod connected with a rotary gear wheel meshing with said pinion and twice the diameter thereof, said pump piston completing each instroke at the completion of every 90 second instroke of the cylinder piston, a rotary rod with a worm wheel meshing with said worm and having cams thereon engaging with an inlet valve for said pump, the controlling pipe valve, and with an exhaust valve 95 for said gas chamber, said parts being combined substantially as described.

HENRY POKONY.

Witnesses:

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