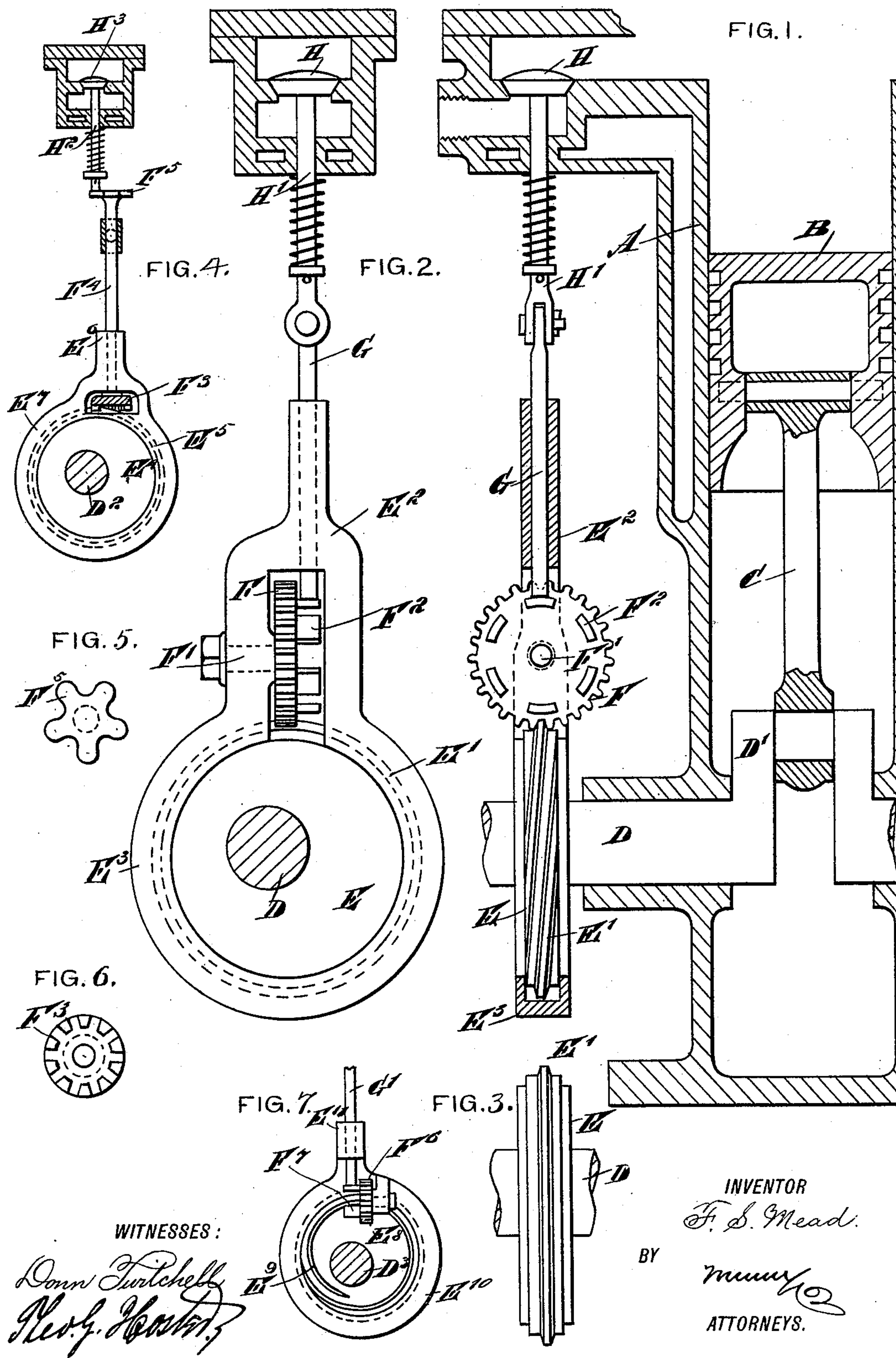


(No Model.)

F. S. MEAD.
VALVE GEAR FOR GAS ENGINES.

No. 594,260.

Patented Nov. 23, 1897.



UNITED STATES PATENT OFFICE.

FRANK S. MEAD, OF MONTREAL, CANADA.

VALVE-GEAR FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 594,260, dated November 23, 1897.

Application filed November 14, 1896. Serial No. 612,061. (No model.)

To all whom it may concern:

Be it known that I, FRANK S. MEAD, a citizen of the United States, residing in Montreal, in the Province of Quebec and Dominion of
5 Canada, have invented a new and Improved Valve-Gear for Gas-Engines, of which the following is a full, clear, and exact description.

The invention relates to four-period gas and oil engines; and its object is to provide for
10 such gas-engines a new and improved valve-gear which is simple and durable in construction, not liable to get out of order, and arranged to positively and directly operate the valve from the engine-shaft, entirely dispensing with the usual side shaft, gears, cams,
15 bell-cranks, and other complicated devices heretofore employed for the purpose.

The invention consists principally of a wheel for controlling the movement of the valve,
20 the said wheel having an intermittent rotary movement and a reciprocating travel in the direction of the valve-stem.

The invention also consists of certain parts and details and combinations of the same, as
25 will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.
30

Figure 1 is a sectional side elevation of the improvement as applied. Fig. 2 is a sectional end view of the same. Fig. 3 is a side elevation of the eccentric. Fig. 4 is a sectional
35 end view of a modified form of the improvement. Fig. 5 is an enlarged plan view of the wheel for operating the valve-stem of the device shown in Fig. 4. Fig. 6 is an inverted plan view of the crown-wheel for the device
40 shown in Fig. 4, and Fig. 7 is an end elevation of another modified form of the improvement.

The engine shown in Fig. 1 is provided with the usual cylinder A, in which reciprocates a
45 piston B, connected by a pitman C with a crank-arm D', formed on the main or driving shaft D. On the latter is secured the disk E of an eccentric, the said disk having peripheral worm-teeth E', one-half of which are
50 straight, as indicated in Fig. 3, the teeth being in mesh with a worm-wheel F, journaled at F' on an eccentric-rod E², projecting from

a strap E³, engaging the disk E in the usual manner.

On the face of the wheel F are arranged
55 lugs F², placed suitable distances apart and each adapted to engage the free end of a rod G, fitted to slide in the eccentric-rod E² and pivotally connected with the stem H' of the valve H, controlling the inlet and outlet of
60 the gaseous mixture and exhaust to and from the cylinder A.

It is evident that by the arrangement described the rotary motion of the eccentric-disk E causes a reciprocation of its eccentric-rod E², and consequently of the wheel F,
65 journaled on the said rod. Furthermore, the rotary motion of the eccentric-disk E imparts, by its teeth E', an intermittent rotary motion to the said wheel F.
70

Now when the several parts are in the position shown in Figs. 1 and 2 then the reciprocating motion given to the wheel F causes the lug F², engaging the rod G, to move the
75 latter, so as to raise the stem H' and lift the valve H off its seat. On the return stroke of the rod E² the valve H again closes by the action of the spring on its valve-stem. During this return movement the wheel F receives a rotary motion from the teeth E' of
80 the disk E, so that on the next outward stroke of the rod E² and wheel F the rod G passes between the two succeeding lugs F², and consequently the valve H remains on its seat and is not opened during this revolution of
85 the shaft D. On the next return stroke of the rod E² the wheel F is again turned by the teeth E' to bring the next lug F² in alinement with the rod G, and consequently on the next outward stroke an unseating of the valve H
90 again takes place. Thus the valve is actuated at every second revolution of the shaft D.

In the modified form shown in Fig. 4 the main shaft D² carries an eccentric-disk D⁴,
95 formed on its periphery with worm-teeth E⁵, in mesh with a crown-wheel F³, secured on the lower end of a shaft F⁴ and journaled in an eccentric-rod E⁶, held on a strap E⁷. On the outer end of the shaft F⁴ is secured a
100 toothed wheel F⁵, the teeth or lugs of which are adapted to engage the stem H² of a valve H³ during every second revolution of the shaft D². The operation of this device is similar to the one above described in reference to

Figs. 1, 2, and 3. The valve H^3 is opened at every second revolution of the shaft D^2 .

In the modified form shown in Fig. 7 the main shaft D^3 carries an eccentric-disk E^8 ,
 5 formed on its face with a cam-tooth E^9 , in mesh with a gear-wheel F^6 , journaled on the eccentric-strap E^{10} , for the disk E^8 . On the wheel F^6 are lugs F^7 , similar to the lugs F^2 , and engaging the rod G' , connected with the
 10 valve-stem and fitted to slide in the eccentric-rod E^{11} of the eccentric-strap E^{10} .

When the disk E^8 rotates with the main shaft D^3 , then the tooth E^9 imparts an intermittent rotary motion to the wheel F^6 and
 15 the latter reciprocates with the eccentric-strap and its rod E^{10} to shift the rod G' whenever the lug F^7 is in alinement with the said rod. This takes place at every second revolution of the shaft D^3 .

20 It is evident that the device described forms a mechanical movement which can be used for various other purposes besides a valve-gear, and hence I do not limit myself to the application of the device as a valve-gear.

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

1. A valve-gear, comprising an eccentric formed at its disk with cam or worm teeth, a
 30 toothed wheel in mesh with the said disk and journaled on the eccentric-rod and means for operating the valve from the toothed wheel, substantially as shown and described.

2. A valve-gear, comprising an eccentric
 35 formed on its disk with teeth, a toothed wheel in mesh with the said disk and carrying lugs for intermittently engaging the valve-stem, the said wheel being journaled in the eccentric-rod and reciprocating with the same, sub-
 40 stantially as shown and described.

3. A valve-gear, comprising an eccentric, and a wheel for controlling the valve and journaled on the eccentric-rod, to reciprocate

with the latter, the said wheel being in mesh with the disk of the said eccentric, substan- 45 tially as shown and described.

4. A valve-gear, provided with an eccentric, and a wheel journaled on the eccentric-rod and controlling the movement of the valve, the said wheel receiving an intermittent ro- 50 tary motion from the said eccentric-disk, substantially as shown and described.

5. The combination of a toothed eccentric, its straps and rod, a wheel mounted in the rod and provided with pins or lugs, and means 55 for operating the said wheel from the toothed eccentric, substantially as herein shown and described.

6. The combination with a spring-pressed valve of a toothed eccentric, an eccentric- 60 strap, a toothed wheel carried by the strap and meshing with the teeth of the eccentric, and means for moving the valve against the action of its spring from said wheel substan- 65 tially as described.

7. The combination with a valve-stem, of a toothed eccentric, an eccentric-strap and its rod, and a toothed wheel mounted in the eccentric-rod and meshing with the toothed eccentric, said wheel being provided with lat- 70 erally-projecting pins or lugs intermittently engaging the valve-stem, substantially as described.

8. The combination with a valve and its stem, of an eccentric having worm-teeth on 75 its periphery, an eccentric-strap and its rod, a toothed wheel mounted in the rod and meshing with the eccentric, said wheel being provided with laterally-projecting pins, and a rod fitted to slide in the eccentric-rod and 80 connected with the valve-stem, substantially as herein shown and described.

FRANK S. MEAD.

Witnesses:

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 P. GORMAN.