

No. 748,615.

PATENTED JAN. 5, 1904.

W. R. KAHLENBERG.
GAS ENGINE.

APPLICATION FILED FEB. 8, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

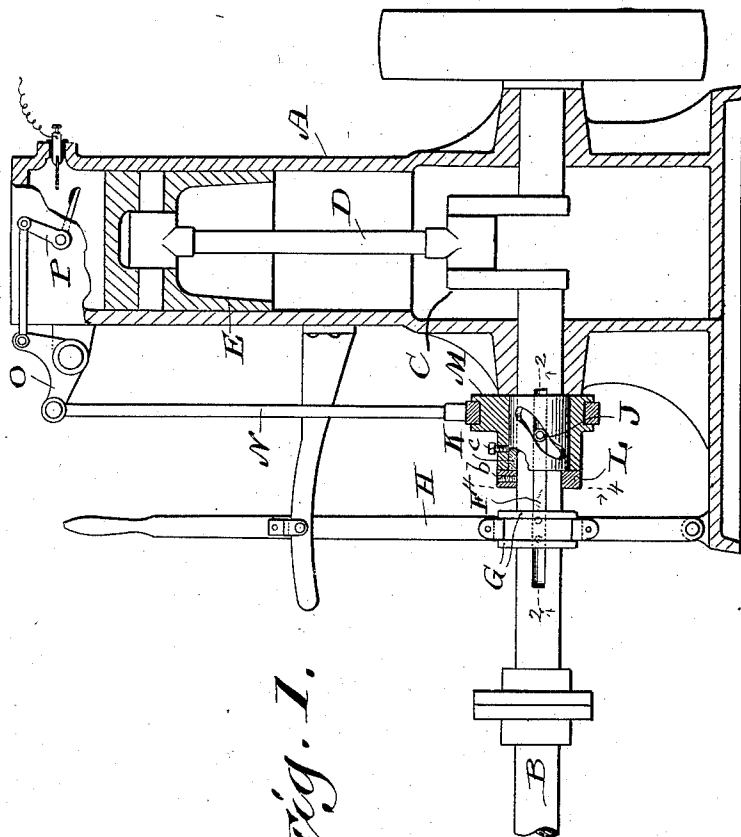


Fig. 1.

Witnesses:
Geo. W. Young,
N. E. Oliphant

Inventor
William R. Kahlenberg
By H. G. Underwood
Attorney

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2 SHEETS—SHEET 2.

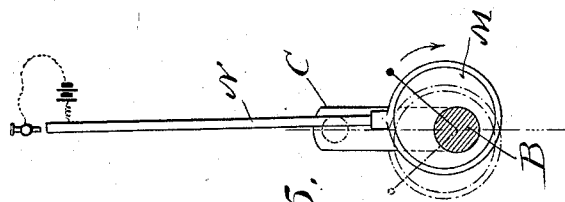


Fig. 5.

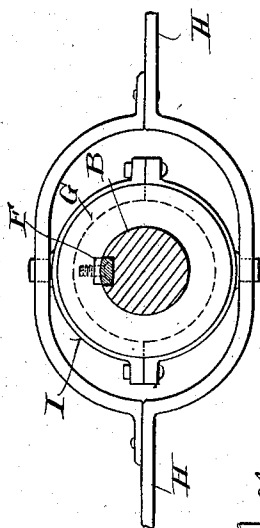


Fig. 3.

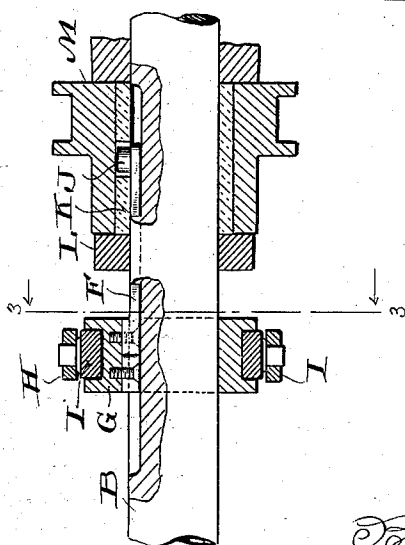


Fig. 2.

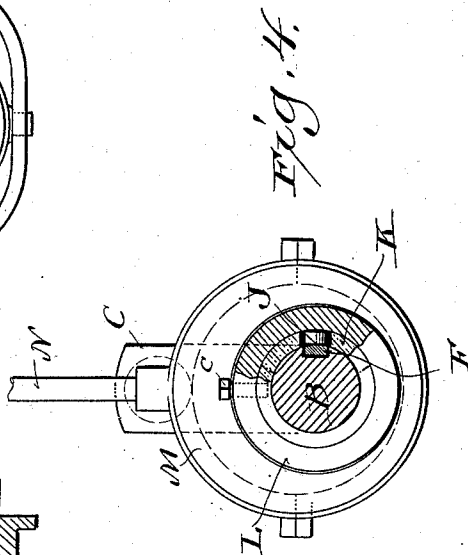


Fig. 4.

Witnesses:
Geo. H. Young,
N.E. Oliphant

Inventor
William R. Kahlenberg.
By H.G. Underwood
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM R. KAHLBERG, OF TWO RIVERS, WISCONSIN.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 748,615, dated January 5, 1904.

Application filed February 8, 1901. Serial No. 46,472. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. KAHLBERG, a citizen of the United States, and a resident of Two Rivers, in the county of Manitowoc and State of Wisconsin, have invented certain new and useful Improvements in Gas-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to provide means for reversing a gas-engine and to utilize the same means for regulating the time at which explosions will occur in the engine cylinder or cylinders with respect to position of a piston crank or cranks in revolution, said invention consisting in what is hereinafter particularly set forth with reference to the accompanying drawings and subsequently claimed.

Figure 1 of the drawings represents a partly sectional view of a portion of a gas-engine provided with means for carrying out the object of my invention; Fig. 2, a detail partly sectional view indicated by line 2 2 in the first figure; Fig. 3, another detail partly sectional view indicated by line 3 3 in the second figure; Fig. 4, a partly broken sectional view indicated by line 4 4 in said first figure, and Fig. 5 a diagram illustrating the greatest throw in either direction of an eccentric that is herein shown in rotary adjustable connection with the engine-shaft.

Referring by letter to the drawings, A indicates the crank-chamber and cylinder of a gas-engine, such as is particularly designed for marine use; B, the engine-shaft, having its crank C in connection with the rod D of piston E, that reciprocates in said cylinder.

The engine-shaft is herein shown provided with a longitudinal groove that contains a slide F, made fast by screws or otherwise at one end to an annularly-grooved collar G, loose on said shaft, and a hand-lever H is arranged in connection with a spanner-ring I, that fits in the collar-groove. Arranged on a stud projecting from the other end of slide F is shown an antifriction-roller J, that engages a spiral slot in a bushing K, that is loose on the engine-shaft against a collar L, made fast to said shaft by a set-screw b or otherwise, as most convenient.

Held in permanently-adjusted position on bushing K by a set-screw c is shown the hub of an eccentric M, and in strap connection with the eccentric is a pitman N in union with a bell-crank O, that is linked to a rocker P, that constitutes an element of an electric sparking apparatus common in the art to which my invention relates.

While I have shown a preferred construction and arrangement of parts for accomplishing the object of my invention, the mechanical details of the mechanism are susceptible to some variation without departure from the scope of said invention.

The eccentric M is primarily set so that its highest point is normally in line with the piston-crank C on center when the piston E is at the limit of its compression stroke in the cylinder and the device projecting from the slide F is midway of the length of the spiral slot in the bushing K, to which said eccentric is made fast, it being designed to have sparking take place about the time said parts are in the positions described. The diagram Fig. 5 illustrates the crank C in the above-described position and also illustrates that sparking will take place to cause explosion of compressed gas when said crank is moving past center. To speed up the engine, the eccentric is shifted by a movement of the hand-lever H and slide F, the sparking and explosion being then brought about ahead of the time the engine-crank comes to center, as shown in Fig. 1, the limit of this shift being such that expansion of gas in the engine will not interfere with said crank being carried past center by acquired momentum. To reverse the engine, the eccentric is shifted farther in the same direction as aforesaid, as far as the spiral slot in K will permit, so that a sparking and an explosion will take place so far ahead of the crank as to cause the same to turn in the direction opposite that of its previous revolution, and said eccentric is then shifted to bring its highest point in line with said crank, whereby subsequent explosions will properly occur to maintain the revolution of the engine-shaft in the new direction, the speed being accelerated by shifting the aforesaid eccentric ahead of the aforesaid crank in said new direction to cause an earlier

sparkling within a limit that will not result in backward rotation.

The shift of the eccentric in both directions from crank-center is shown by full and dotted lines in Fig. 5, the highest point of said eccentric in either position being indicated by similar lines radiating from the center of the engine-shaft. Hence it will be readily understood that when said highest point of the eccentric is shifted only half-way between crank-center and limit of adjustment in the direction of revolution on the part of the shaft of the engine the latter will be running at full speed.

While I have shown and described a single-cylinder engine, my invention is readily applicable to a multiple-cylinder engine, in which a requisite number of devices will be arranged in rotarily-adjustable connection with the crank-shaft of such engine to actuate the various necessary sparking mechanisms employed, the organization being such

that all of said rotarily-adjustable devices are shifted as one.

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

A gas-engine having a longitudinally-grooved crank-shaft, a collar loose on the shaft, a slide fast to the collar and arranged in the shaft-groove, lever mechanism in connection with said collar, a spirally-slotted bushing loose on said shaft, a projection on the slide engaging the bushing-slot, and a spark-control eccentric adjustably connected to the bushing.

In testimony that I claim the foregoing I have hereunto set my hand, at Two Rivers, in the county of Manitowoc and State of Wisconsin, in the presence of two witnesses.

WILLIAM R. KAHLBERG.

Witnesses:

HANS HENRICKSON,
FRED W. DICKE.