

No. 741,848.

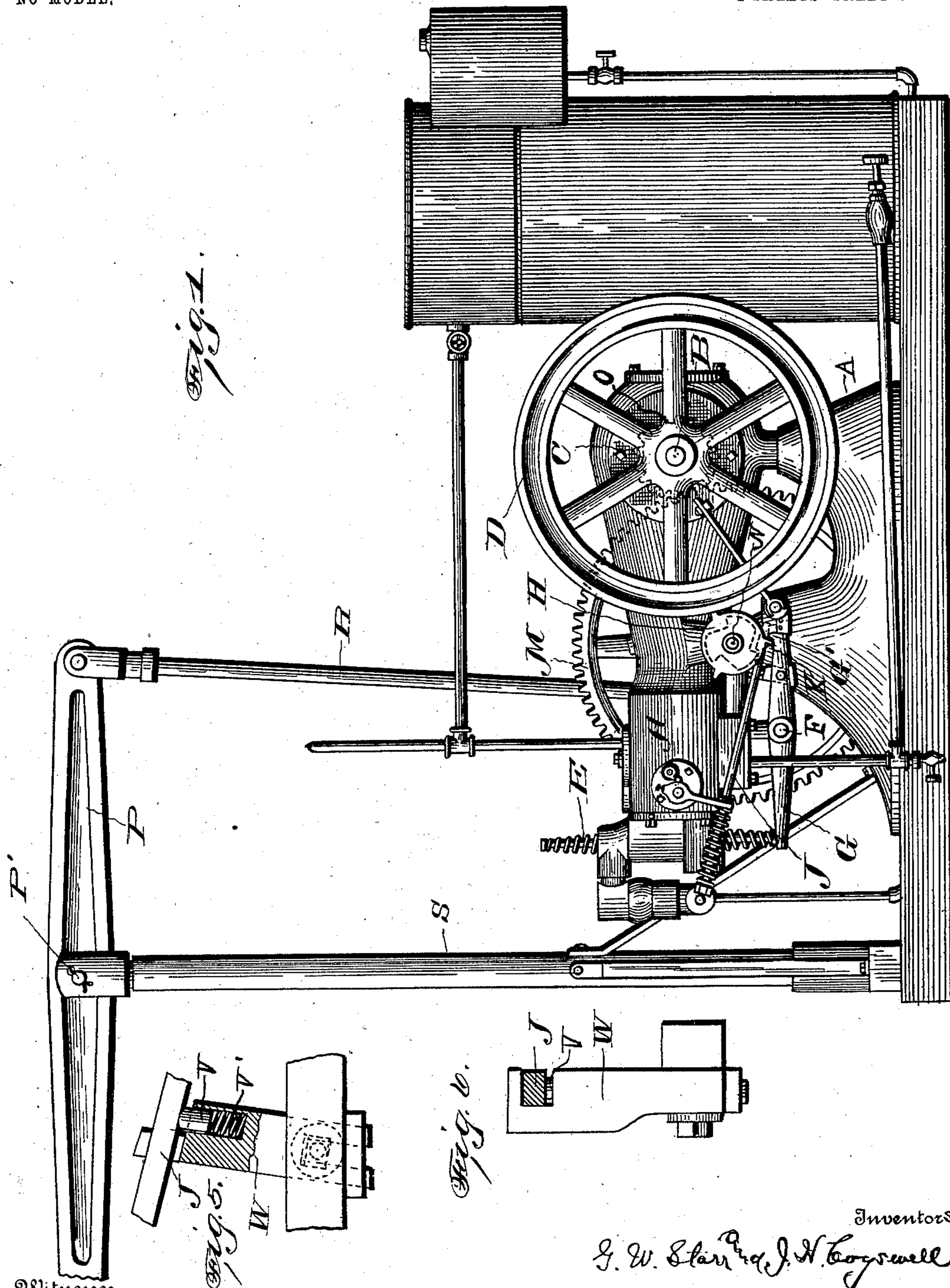
PATENTED OCT. 20, 1903.

G. W. STARR & J. H. COGSWELL.  
VALVE GEAR FOR EXPLOSIVE ENGINES.

APPLICATION FILED JULY 10, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

R. A. Boswell.  
J. M. Henderson.

Inventors  
G. W. Starr & J. H. Cogswell

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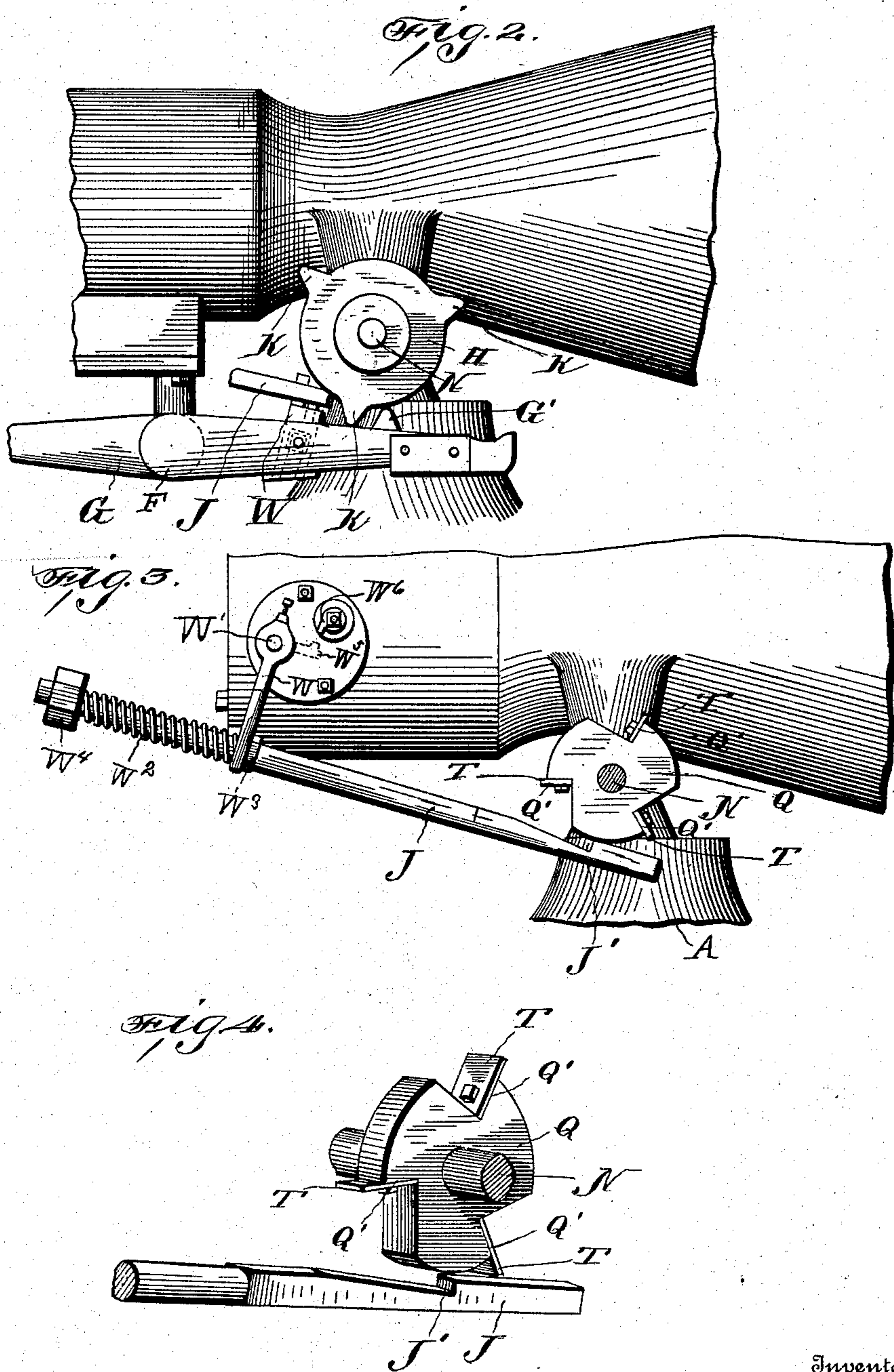
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R. A. Bowell.  
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# UNITED STATES PATENT OFFICE.

GEORGE W. STARR AND JOHN HENRY COGSWELL, OF HAVANA, ILLINOIS.

## VALVE-GEAR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 741,848, dated October 20, 1903.

Application filed July 10, 1902. Serial No. 115,055. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE W. STARR and JOHN HENRY COGSWELL, citizens of the United States, residing at Havana, in the county of Mason and State of Illinois, have invented certain new and useful Improvements in Valve-Gear for Explosive-Engines; and we do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in gasolene-engines, and especially to the provision of a three-point cam rotating with a counter-shaft carrying a gear-wheel driven from the main power-shaft and provided for the purpose of actuating exhaust means, while the gear-wheel is utilized for the purpose of driving a walking-beam designed to drive a pump or other mechanism. Another feature of the invention resides in the provision of a notched wheel rotating with and adjacent to the three-point cam-wheel, which is adapted at each revolution of the notched wheel to cause a rod to be reciprocated, whereby sparking mechanism is actuated three times, corresponding to the actuation of the exhaust mechanism.

Our invention consists, further, in various other details of construction and combinations of parts, as will be hereinafter fully described and then specifically defined in the appended claims.

Our invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this application, and in which drawings similar letters of reference indicate like parts in the views, in which—

Figure 1 is a side elevation of an engine, showing our improved means for actuating the exhaust mechanism and for operating the sparker. Fig. 2 is a view, on an enlarged scale, of the three-point cam and oscillating lever actuated thereby. Fig. 3 is a view in side elevation showing the notched wheel and means for actuating the sparker mechanism. Fig. 4 is an enlarged detail view of the notched

wheel and rod actuated thereby. Figs. 5 and 6 are detail views of parts of the mechanism.

Reference now being had to the details of the drawings by letter, A designates the frame of our engine, having a main power-shaft B suitably journaled in the chamber C, and keyed to said shaft are the fly-wheels D. At one end of the combustion-chamber is a spring-actuated exhaust-valve E, controlling the exhaust-port in the combustion-chamber, and pivotally mounted to rock on a shaft F, carried by the frame of the engine, is a lever G, having a tapering lug or projection G' on its upper edge, near one end thereof, while its other end is positioned adjacent to and directly under the lower end of the shank portion of the exhaust-valve, as shown. Keyed to rotate with the shaft N is a cam-wheel H, having three points (designated by letters K) which are positioned equidistant about the circumference thereof, and keyed to the other end of said shaft N is a gear-wheel M, the circumferential teeth of which are in mesh with the teeth of the pinion O, keyed to rotate with the main power-shaft. To said gear-wheel is adjustably and pivotally held one end of a pitman-rod R, the other end of which is pivotally fastened to one end of the walking-beam P, which oscillates on a pin P', carried by the post S. The opposite end of said walking-beam is designed to be connected to the piston of a pump or to other mechanism, as may be desired.

Keyed to the shaft N is a wheel Q, having three notches Q' formed at locations equidistant about its circumference, and to protect each of the edges of the notches steel face-plates T are screwed or otherwise securely fastened to the edges of the notches to prevent rapid wear thereon. A rod J, which passes through an apertured arm W, mounted on a rock-shaft W' of a sparking apparatus, carries a spring W<sup>2</sup>, one end of which bears against a nut W<sup>4</sup>. Said shaft W' carries an electrode W<sup>5</sup>, designed to contact with a second electrode W<sup>6</sup>, on which said rod is reciprocated. In one end of said rod J is a notch J', in which the outer free ends of the plates T engage as the wheel Q rotates, thus causing the sparking mechanism to be actuated three times by said wheel Q and at such predetermined moments as to cause the charge

of gas to be exploded within the combustion-chamber.

Referring to Figs. 2, 5, and 6 of the drawings, it will be observed that said rod J passes  
5 through an aperture in the upper end of the arm W, which is adjustably held by means of a bolt passing through the rocking lever G. and held by means of suitable nuts. A spring-actuated dog V is adapted to be held by means  
10 of a spring V', seated in a slot in said arm W, yieldingly against the rod.

From the foregoing it will be noted that by the use of a three-point cam we are enabled to force the exhaust-valve directly from the  
15 cam-wheel and utilize the gear-wheel solely for the purpose of driving the pitman, which latter in turn actuates the walking-beam, to which the pump-piston may be connected, and by the provision of a notched wheel hav-  
20 ing a plate in each notch corresponding to the points of the cam the sparking mechanism is actuated at the proper moments.

Having thus described our invention, what we claim to be new, and desire to secure by  
25 Letters Patent, is—

1. In combination with the power-shaft, a pinion-wheel thereon, a counter-shaft, a gear-wheel mounted thereon and in mesh with said pinion, a three-point cam rotating with the  
30 power-shaft, a valve, a rock-lever with a lug

thereon designed to be tripped by the points of the cam to actuate said valve, a notched wheel keyed to rotate with the counter-shaft, a sparker and a spring-actuated notched rod  
35 for operating the same, a plate carried by said lever and through which plate said rod passes, and a spring-pressed dog bearing against said rod to hold same in contact with the notched wheel, as set forth.

2. In combination with the power-shaft, a  
40 pinion-wheel thereon, a counter-shaft, a gear-wheel mounted thereon and in mesh with said pinion, a three-point cam rotating with said power-shaft, a valve, a rock-lever with a lug  
45 thereon designed to be tripped by the points of said cam to actuate said valve, a notched wheel keyed to rotate with the counter-shaft, a sparker and a spring-actuated notched rod  
50 for operating the same, a bolt passing through said lever, a plate mounted on said bolt, a spring-pressed dog carried by said plate and adapted to bear against and hold said rod in contact with the notched wheel, as set forth.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

GEORGE W. STARR,

JOHN HENRY COGSWELL.

Witnesses:

J. B. FAGER,

W. A. HEMING, Sr.