

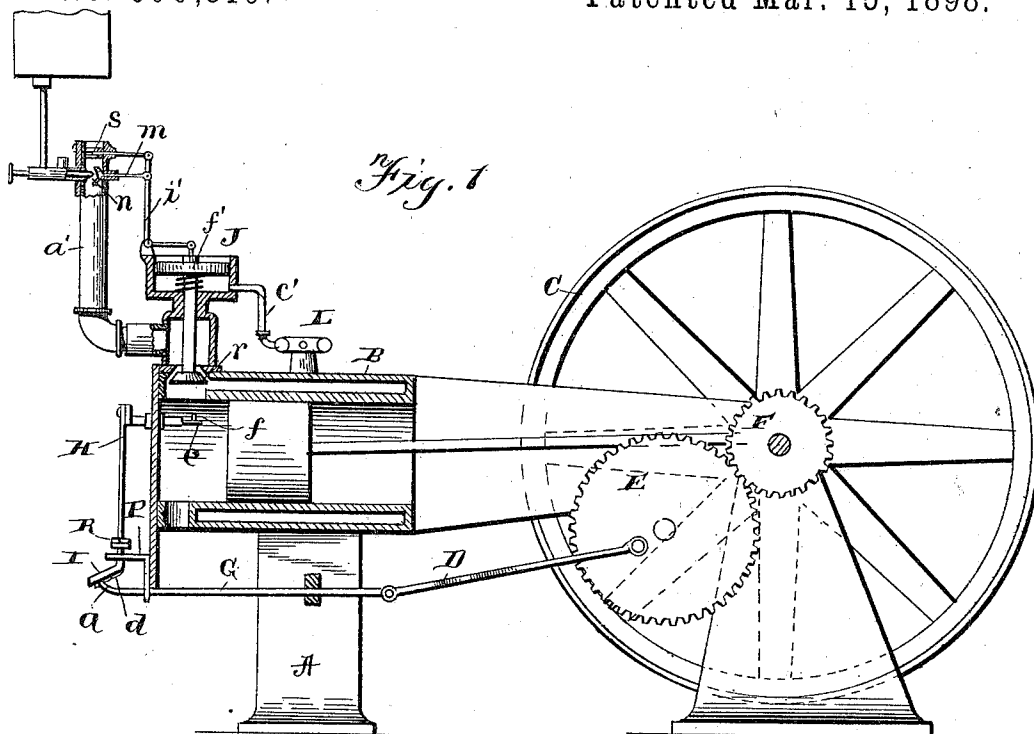
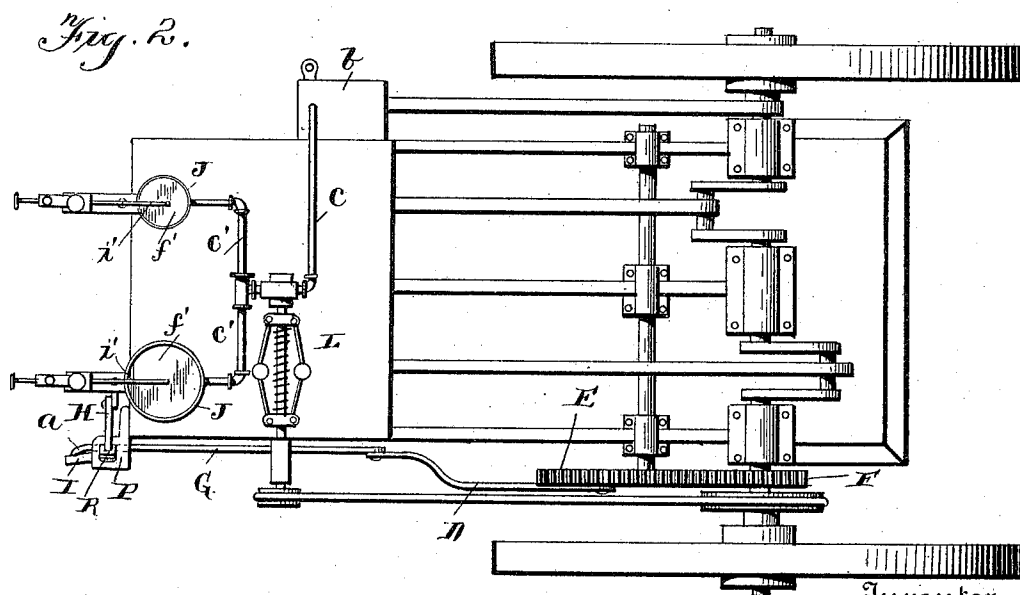
(No Model.)

2 Sheets—Sheet 1.

A. WINTON.
EXPLOSIVE ENGINE.

No. 600,819.

Patented Mar. 15, 1898.



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(No Model.)

2 Sheets—Sheet 2.

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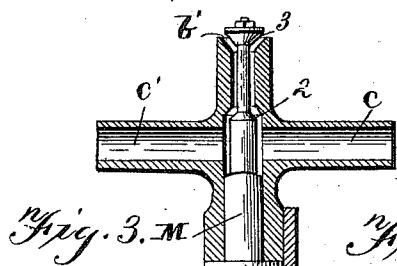


Fig. 4.

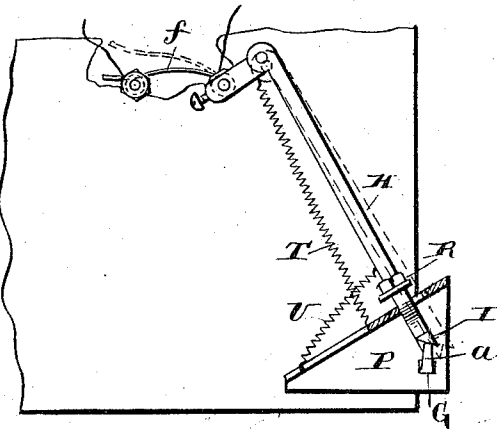


Fig. 5.

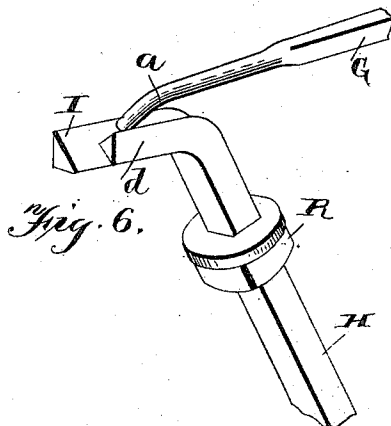


Fig. 6.

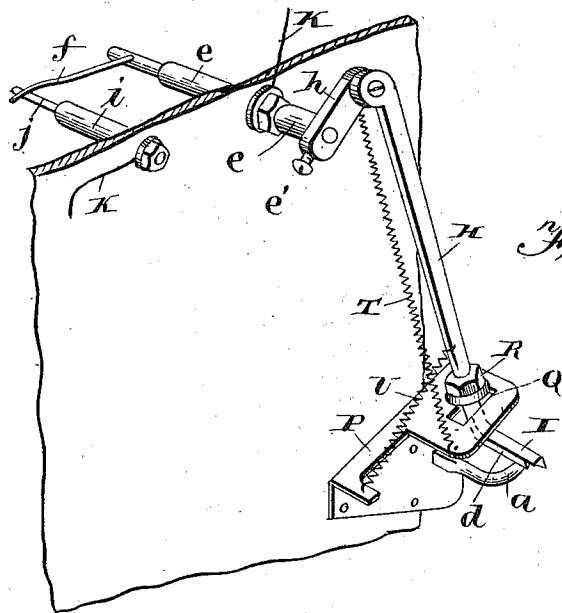
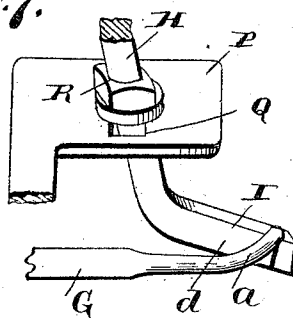


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF CLEVELAND, OHIO.

EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 600,819, dated March 15, 1898.

Application filed June 26, 1896. Renewed February 12, 1898. Serial No. 670,146. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WINTON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Explosive-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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in explosive-engines, and pertains to certain improvements in a governor therefor and an electric sparker or igniting device, which will be fully described hereinafter and particularly pointed out in the claims.

One object of my invention is to provide a simple and reliable sparker or igniting device for the explosive-chamber of the engine.

Another object of my invention is to provide an improved form of valve regulated through the medium of a governor for controlling devices which control the feeding of a hydrocarbon liquid to be vaporized and conveyed to the explosion-chamber.

In the accompanying drawings, Figure 1 is a view, partly in section and side elevation, of an engine with my improvements attached. Fig. 2 is a top plan view of the same. Fig. 3 is an enlarged sectional view showing the particular form of the valve for regulating the admission of pressure to a fluid-feed regulator. Fig. 4 is an end view of my improved igniter. Fig. 5 is a perspective view of the same. Fig. 6 is a detail view of the lower end of the rod for actuating the igniter and the reciprocating pitman for actuating said rod. Fig. 7 is a side elevation of the same.

Referring now to the drawings, A indicates the engine-bed; B, the cylinder; C, the driving-wheels; E and F, the gearings, and D a pitman connected with a reciprocating rod G. The outer end of this rod G is reduced, as clearly shown in Figs. 6 and 7, and has its free end turned upward, as shown at *a*. The gearings E and F are so timed that the igniter is only ignited at every other stroke of the engine, as is necessary in explosive-engines of this character, and need not be further de-

scribed, the same being well understood by those skilled in the art.

In the head of the cylinder is arranged an oscillating shaft *e*, carrying at its inner end, within the cylinder, a laterally-extending contact or sparking wire *f*. Attached to the outer end of the shaft or rod *e* is a crank *h*, the same being attached to the shaft *e* through the medium of a set-screw *e'*. Connected to the opposite end of the crank *h* is a spring-actuated rod H, the lower end of the said rod being guided in a slot Q of a bracket P, which is suitably attached to the head of the cylinder of the engine. The lower end of this spring-actuated rod H is turned laterally, as shown, to form a bearing-head I. This head I has a rib or flange *d*, serving to form practically a groove or shoulder, as clearly shown in Fig. 6, with which the upturned end *a* of the end-wise-moving rod G engages. A spring T is connected with the crank *h* or may be connected with the rod H itself, the opposite end of the spring being shown as connected to the bracket P, the function of which is to normally hold the rod H down, with its top R in contact with the bracket, as will be readily understood. The slot Q in the bracket P, through which the lower end of the lever or rod H passes, is elongated to permit the rod a lateral movement, and a spring U is provided for normally holding the lever or rod H in the position shown in dotted lines in Fig. 4. A stud or projection *i* also extends through the head of the cylinder and is provided with the sparking-arm *j*, operating with the laterally-extending arm *f* of the shaft *e*, and the shaft *e* and the stud *i* are provided with wires K, which electrically connect these studs with a suitable battery or other electrical source.

The operation of this device is as follows: The rod G being reciprocated through the medium of the pitman B and wheel E and F from the main shaft of the engine, its upturned end *a* engages the shoulder formed by the rib *d* and in its outward movement forces the rod or lever H up, owing to the fact that the engaging edge I of the rod extends downward at an inclination to the line of travel of the rod G. This upward movement is against the tension of the spring T, as before stated,

and the rod or lever H causes the arm *f* to engage the contact point or wire *j*, thus closing the circuit to the electrical source. The movement of the rod G is sufficient to carry its upturned end *a* beyond the end of the rib *d*, and immediately the arm or lever H is released and instantly drawn downward by the spring T, thus separating the contacts *j* and *f*, which causes a spark, as will be readily understood. These parts are so timed that the sparking is made at the proper time in the explosion-chamber, as will be readily understood. The crank *h* being adjustable upon the rod *e*, it can be set to cause the contacts *f* and *j* to properly cooperate.

From this description it will be seen that the sparker is of such a construction as to make it of absolute and positive movement and make positive and certain the creating of the spark at exactly the right time.

The admission of the explosive mixture is regulated through the medium of diaphragms *f'*, situated within the cylinders J, the diaphragms being connected with the valves *r*, which control the inlet-openings for mixture, the diaphragms being subjected to pressure from a pump *b*, connected with the cylinders by pipes *c c'* at points below the diaphragms, whereby the valves *r* are allowed to open more or less or be entirely closed, according to the pressure beneath the diaphragms. Connected with the diaphragms *f'* are bell-crank levers *i'*, which in turn are connected with the fluid-controlling valves *n* through the medium of the stems *m*. By means of this construction when the valves are opening for admitting the explosive mixture the fluid-controlling valves *n* are moved away from their fluid-opening to admit the fluid, and close the fluid-openings when the valves are closed, as will be readily understood.

Situated in the pipe *a'* above the fluid-controlling valve *n* are air-controlling valves *s*, connected with the upper ends of the bell-crank levers *i'*.

In operation when the inlet-valves *r* are drawn inward for admitting the explosive mixture the diaphragms *f'* connected therewith are correspondingly moved, which actuates the bell-crank levers *i'* and consequently moves the fluid and air controlling valves *n* and *s* for admitting air and hydrocarbon fluid, which produces an explosive compound.

A ball-governor L is situated at a point between the pump *b* and the cylinders J and serves to regulate an escape-opening *b'* by means of a valve 2, connected with the stem of the governor. My present improvement in this valve 2 consists in extending the valve portion out and forming on its outer end a valve 3 in addition to the valve 2, whereby should the governor-belt become broken or otherwise accidentally injured the spring of the ball-governor L will draw its stem M outward, causing the valve 3 to close firmly the escape-opening *b'*. The air then being forced into the cylinders J operates upon the pis-

tons *f'* therein and holds the inlet-valves *r* closed, thus shutting off both the flow of fluid and air and causing the engine to automatically stop, as will be readily understood.

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

1. An electric sparker comprising contact-points, a rod as H connected with and adapted to move one of the contacts, the lower end of the rod having its end turned laterally to form an inclined plane, and a groove upon its inclined surface, and an endwise-moving rod adapted to engage said groove, the parts adapted to cooperate as described.

2. A governor for explosive-engines comprising a fluid-feed, a valve *n* for regulating the same, a diaphragm or piston adapted to control the valve, a pump actuated by the engine and in communication with the said diaphragm or piston, a governor, an escape situated in the communication between the pump and the diaphragm or piston, and a governor operating a valve adapted to close the escape in either direction of movement, substantially as described.

3. An electric sparker comprising two contacts one movable in relation to the other, a spring normally holding the contacts out of engagement, an arm rigidly connected to one of the contacts, a rod H having one end pivoted to the said rigid arm, and its opposite end carrying a cam-surface, and an endwise-moving rod actuated by the engine and engaging the said cam-surface and having a movement beyond the same, whereby the rod H is released, substantially as described.

4. An electric sparker comprising two contacts, one carried by an oscillating shaft, an arm connected with the projecting end of the shaft, a spring-actuated rod H having one end flexibly connected with the said arm and its opposite end moving in a guide limiting its downward and lateral movements, an endwise-moving rod actuated by the engine, and a cam-surface coacting between the endwise-moving rod and the spring-actuated rod H for moving the latter upward against the tension of the spring and causing the contacts to engage, the cam-surface being constructed to disengage the endwise-moving rod and thereby separate the contacts, substantially as described.

5. An electric sparker comprising two contacts one movable in relation to the other, a cam-surface operatively connected with the movable contact, the cam-surface having a groove ending in an incline, and movable laterally, and an endwise-movable rod actuated by the engine and engaging the groove, the movement of the rod being beyond the groove to engage the incline of the surface, thus permitting the incline or cam-surface to move downward and laterally out of engagement with the rod to permit the rod to be again withdrawn, substantially as described.

6. A governor for explosive-engines com-

prising an explosive-inlet port, a valve controlling the same, a pressure-actuated member controlling the valve, a pressure-producing device, a communication between the
5 pressure-producing device and the pressure-actuated member, an escape-opening regulating the pressure upon the pressure-actuated member, a valve at each side of said escape-opening, and a governor controlling said
10 valves, substantially as described.

7. A governor for explosive-engines comprising an explosive-inlet port, a valve controlling the same, a pressure-actuated member controlling said valve, a pressure-producing device, a communication between the
15 pressure-producing device and the pressure-controlled member, an escape-opening controlling the pressure on said pressure-actuated member, a governor, a double-acting controller for said escape controlled by the governor,
20 whereby the movement in either direction of the governor to its limit will close said escape-opening, substantially as described.

8. An electric sparker comprising two contacts one movable in relation to the other, a
25 spring normally holding the contacts out of engagement, a rod H positively connected at one end with the movable contact and provided at its opposite end with a cam-surface,
30 and an endwise-moving rod G engaging said cam-surface for moving the rod H endwise, said rod G being operatively connected with the engine, substantially as described.

9. An electric sparker comprising two contacts, one movable in relation to the other, a
35 rod positively connected with the movable contact, a rod positively connected with and operated by the engine relatively to the contact-rod, one of said rods being provided with
40 a cam-surface engaged by the other rod, said cam-surface through the movement of the engine-actuated rod causing the contacts to engage, said cam-surface constructed to release
45 the contact-rod, and a spring normally holding the contacts separated, substantially as described.

10. An electric sparker comprising two contacts, one movable in relation to the other, an
endwise-moving spring-actuated rod positively connected at one end with the movable
50 contact, the opposite end of the rod having a lateral movement, a spring actuating the free end of the rod laterally in one direction, an
endwise-moving rod actuated by the engine, one of the rods having a cam-surface, said
55 cam-surface constructed to move its rod endwise and laterally by engagement with the free end of the other rod, substantially as described.

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

ALEXANDER WINTON.

Witnesses:

L. H. REED,
L. W. LEWIS.