

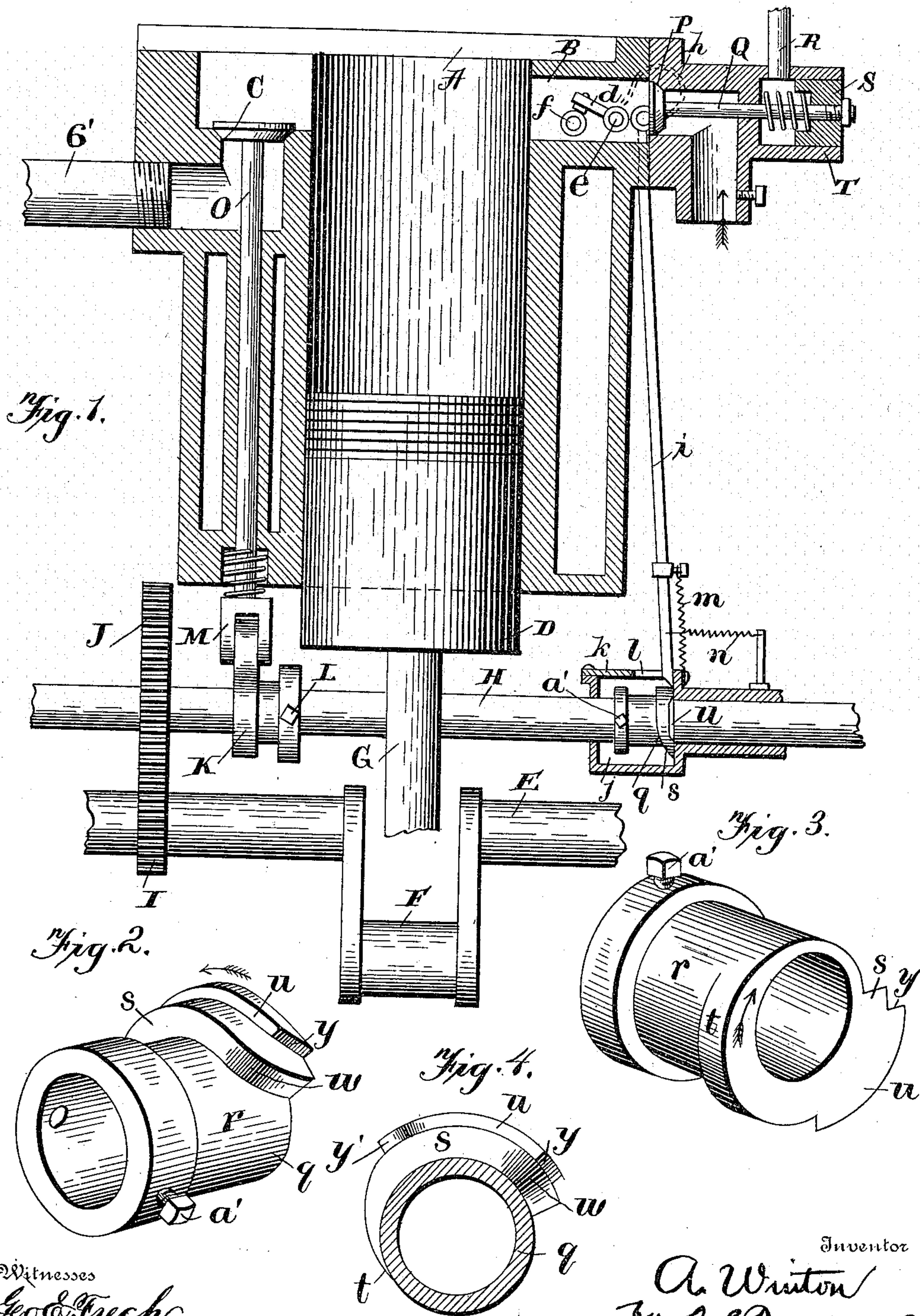
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A. WINTON.
EXPLOSIVE ENGINE.

(Application filed Sept. 18, 1897.)

(No Model.)



Witnesses
Geo. C. Frech.
B. E. Lutz

Inventor
A. Winton
by A. S. Pattison
Asso. Attorney

UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF CLEVELAND, OHIO.

EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 610,465, dated September 6, 1898.

Application filed September 18, 1897. Serial No. 652,175. (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 electric sparkers for gasoline-engines; and it consists in the construction, combination, and arrangement of parts which will be fully described hereinafter and particularly referred to in the claims.

The primary object of my present invention is to provide an improved means for producing an electric ignition-spark, constructed to vary the ignition lead according to the speed of the engine—that is, when the engine is running beyond its normal speed the ignition will occur correspondingly quicker.

Another object of my present invention is to provide a yielding operating member for the sparking members, whereby the contact of the sparking members is insured, the yielding member taking up any wear that may occur and giving a uniform pressure of contact.

My present invention is especially adapted and intended for use in connection with explosive-engines for propelling vehicles; though it may be used advantageously in connection with engines used for other purposes. I find it desirable in motors, especially when intended for use in connection with vehicles, to have the motor run at different speeds for varying the speed of the vehicle instead of using a multiplicity of gears, which greatly decrease the power of the engine when running at a high speed. The speed of the engine varying, it becomes essential and, indeed, in practice necessary to vary the ignition lead automatically according to the speed of the engine, whereby the time of ignition is automatically varied and controlled to occur at the proper time according to the speed of the engine.

Reference is had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a gasoline-engine embodying my invention. Figs 2 and 3 are enlarged perspective views of my improved means for varying the ignition lead according to the speed of the engine. Fig. 4 is a cross-sectional view of the same.

A represents a cylinder having the usual water-jacket, and B the inlet to the explosion end thereof for the explosive mixture.

C is the exhaust-valve, and D the piston.

E is the driving-shaft, F the crank-pin thereof, and G the piston-rod.

Extending, preferably, transverse the cylinder and parallel with the driving-shaft E is a counter-shaft H, carrying a cam K, engaging a wheel M in the lower end of the exhaust-valve stem O, the shaft H being driven through the medium of the gears I and J, whereby the shaft H has one revolution to every two of the shaft E, as is usual in explosion-engines. The cam K is so situated and is adjustable upon the shaft H through the medium of the clamping-screw L that the exhaust-valve is lifted at the proper time to permit the escape of the exhaust.

Situated, preferably, within the explosive-inlet B are the electric contacts, consisting of a stationary contact *f* and an oscillating shaft *e*, also electrically connected, the said shaft having at its inner end an arm *d*, carrying a contact to engage with the inwardly-projecting end of the contact *f*. The outer end of the oscillating shaft *e* is connected with the operating-bar *i* through the medium of a U-shaped spring *h*. This bar *i* is reciprocated through the medium of a cam to be presently described, whereby it is lifted to cause the arm *d* to make contact and then suddenly dropped to quickly separate the contacts for producing the spark. The special function of the spring *h* is to insure a perfect electrical contact and even pressure at all times, while it also serves to take up any wear which may occur upon the contacts, and therefore its form may be varied without departing from the scope of my invention.

My improved means for effecting the ignition or spark at the proper time according to the speed of the engine consists of a cam. This cam comprises a collar *q*, adjustably held to the shaft H by means of a set-screw *a'*, the collar having at one end a cam *s*, which

begins at the point *t*, and having its opposite end in a perpendicular line, but beveled outward to form a beveled or tapered end, as shown at *w*. Situated outside and parallel
 5 with this cam *s* is a flange *u*, having both its ends tapered or beveled, as shown at *y* and *y'*. This cam is situated within a box *j*, its top *k* having an opening *l*, through which the lower end of the rod *i* passes. A spring
 10 *m* serves to hold the rod normally downward, and a spring *n* serves to hold it normally outward against the upper wall of the box, and the outer surfaces of the cams *s* and *u* are in the same plane and rest against the
 15 adjacent face of the boxing *j*, as clearly illustrated.

The operation of my invention is as follows: The cam rotating in the direction indicated by arrow in Figs. 2 and 3 the lower extremity of
 20 the rod *i* is engaged first by the point *t* of the cam, thus gradually lifting the rod and making contact of the electric sparker until the opposite and tapered end of the cam is reached, when the rod drops suddenly downward, causing
 25 a sudden and quick separation of the contacts for creating the sparks. When the engine is running at its normal speed, the lower end of the rod *i* will follow the flange *u* and its tapered end *y* and onto the end or extremity of the tapered portion *w* of the cam *s*.
 30 When the speed of the engine is increased, however, and the cam therefore rapidly rotating, the light spring *m* will not hold or pull the lower end of the rod against the tapered end of the flange or cam *u*, thus causing
 35 the rod to travel in a straight line and dropping off of the tapered end *w* at a point inside of its extremity, thus causing it to drop off sooner, as will be readily understood. The
 40 weight of the rod and the strength of the spring *n* are made of the proportion and strength to cause this result. The taper *y'* serves to force the rod laterally as the cam is being rotated, as will be readily understood
 45 by reference to Fig. 1, so that it will again move in at the opposite taper *y* when the engine is running at its normal speed. When, however, as before stated, the speed of the
 50 engine is increased, the rod will drop off the tapered end *w* farther from its extremity, thus making a quicker ignition. This tapered portion *w* serves still another function, in that if the engine is run backward there will be
 55 no breaking or displacing or straining of the parts, in that the lower end of the rod will simply be forced laterally and travel in the groove *r*. A device of this character is found to automatically regulate the ignition lead of
 60 the engine according to the speed thereof, which is very desirable to get the maximum power of the explosion, in that the full explosion does not occur at the instant of ignition, it requiring a fraction of a second to
 65 ignite the whole of the charge. Hence the most effective explosion is obtained by causing the ignition when the pitman is on the center, so that the ignition of the full charge

occurs just after it passes the center when the engine is running at normal speed. It will thus be apparent that to get the ignition
 70 of the whole of the charge the instant the piston passes the center when the engine is running very rapidly the spark must take place earlier to get the maximum power of the explosion, which is secured when the
 75 whole of the charge is ignited the instant the piston passes its center, at which instant the charge is under the greatest compression, as is understood by those skilled in the art. The taper of the cam and the weight of the rod *i*
 80 and the tension of the spring *n* are made of a proportion to accomplish this result, as before stated.

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

1. A sparker-actuating device for explosive-engines comprising a cam having an abrupt end wall, a tapered end, and a projecting flange ending at a point inside the abrupt
 90 end of the cam, substantially as described.

2. A sparker-actuating device for explosive-engines comprising a collar having a cam with one end beginning on a plane therewith and its opposite end having an abrupt tapered
 95 wall, the cam having a parallel projecting flange at its longest side with tapered ends, substantially as described.

3. An electric sparker for explosive-engines comprising electric contacts, means for suddenly separating the contacts, a rotating cam having an abrupt end wall and a tapered end,
 100 and an endwise and laterally moving member engaging the said cam and operating one of the contacts, substantially as described.

4. An electric sparker for explosive-engines comprising contacts, means for separating them, a rotating cam having an abrupt end wall and a tapered end, and a parallel flange
 110 at the outer side of the cam ending at a point inside the end of the cam, substantially as described.

5. An electric sparker comprising contacts, means for separating them, a rotating cam having an abrupt end wall and a tapered end,
 115 and a parallel flange at the outer side of the cam and extending parallel therewith having a tapered end ending at a point inside of the end of the cam, combined with an endwise and laterally movable actuating member engaging the cam and operating one of the
 120 contacts, substantially as described.

6. An electric sparker for explosive-engines comprising contacts, means for separating them, a rotating cam an end wall against
 125 which the face of the cam rotates, the cam having an abrupt end wall tapered outward, and a flange parallel with the outer face of the cam projecting outward therefrom, the ends of the flange being tapered and the end
 130 adjacent the tapered end of the cam ending at a point inside of the end of the cam, substantially as described.

7. An electric sparker comprising contacts,

a rotating cam having an abrupt and diagonally-extending wall, a flange projecting from the cam and extending parallel therewith and having its end ending at a point inside the
5 end wall of the cam, a rod having one end engaging the cam, a spring holding the rod normally downward, a spring holding the rod normally against the said flange, the opposite

end of the rod connected with the movable contact, substantially as described. 10

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

ALEXANDER WINTON.

Witnesses:

GEO. H. BROWN,

JOHN G. WAY.