

E. L. PARDEE.  
SPARK ADVANCING AND RETARDING MECHANISM.  
APPLICATION FILED APR. 11, 1912.

1,089,256.

Patented Mar. 3, 1914.

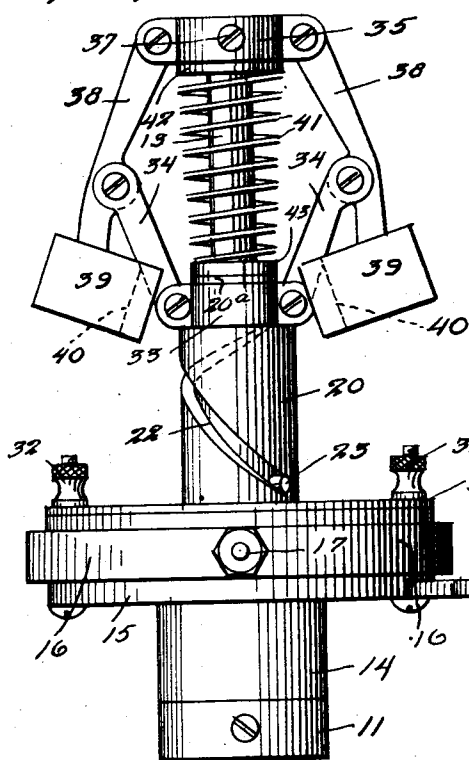


Fig. 1.

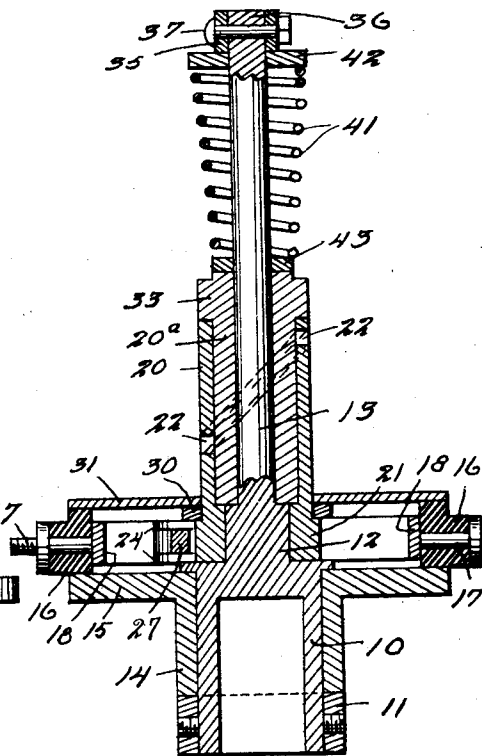


Fig. 2.

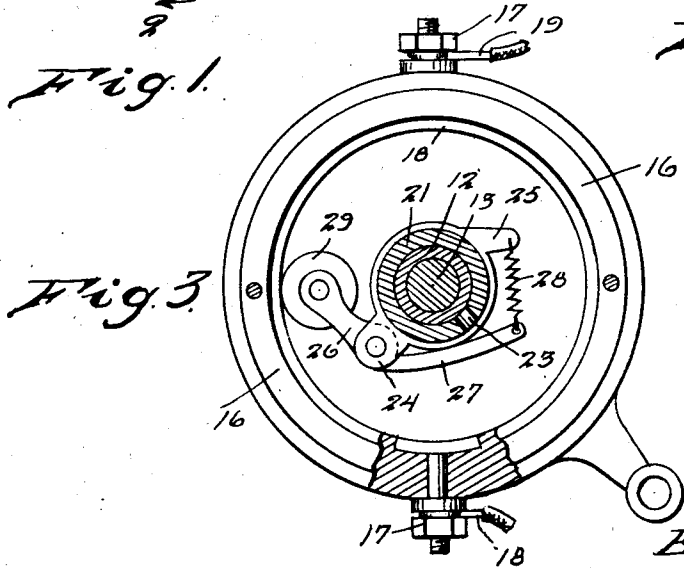


Fig. 3.

Inventor  
E. L. Pardee

Witnesses  
J. Milton Foster  
Wm. F. Swickard

By *Chas. A. Briscoe*  
Attorney

# UNITED STATES PATENT OFFICE.

EDWIN L. PARDEE, OF MARNE, IOWA.

SPARK ADVANCING AND RETARDING MECHANISM.

1,089,256.

Specification of Letters Patent.

Patented Mar. 3, 1914.

Application filed April 11, 1912. Serial No. 689,969.

*To all whom it may concern:*

Be it known that I, EDWIN L. PARDEE, a citizen of the United States, residing at Marne, in the county of Cass and State of Iowa, have invented certain new and useful Improvements in Spark Advancing and Retarding Mechanisms, of which the following is a specification.

This invention relates to new and useful improvements and attachment for explosive motors. An electric spark is used to ignite the gas under compression and has for its object to provide a means whereby said spark may be advanced or retarded, dependent directly upon the speed at which the motor is operated.

A further object of the present invention is to provide a means whereby the spark may be advanced or retarded as the speed of the engine is increased or decreased, dependent upon the supply of gas fed to the engine. Heretofore in the construction of engines of this type, the spark has been retarded and advanced by a lever mounted adjacent to the throttle lever which controlled the supply of gas, it being therefore necessary to operate two levers to increase or decrease the speed of the engine. The present invention eliminates all sparking levers and confines the regulation of the speed of the engine to the throttle lever only, the sparking being automatically advanced.

With the above and other objects in view this invention consists in the construction, combination and arrangement of parts, all as hereinafter more fully described, wherein:—

Figure 1 is a side elevation of the attachment forming the subject matter of the present invention. Fig. 2 is a central vertical section taken along line 2—2 of Fig. 1. Fig. 3 is a horizontal section taken through the timer mechanism.

Reference being had more particularly to the drawings, 10 indicates a socket adapted to be connected by means of any suitable means to the timer shaft of an engine in such a manner that said socket will rotate at the same speed with which the timer shaft of the engine rotates, the lower terminal of said socket being encircled by a rigid collar 11 adapted to rotate therewith. The upper terminal of the socket 10 is closed and is provided with a concentric projection 12 thereon, and a timing shaft 13 integral therewith. A collar 14 is mounted upon the

socket 10 and rests upon the collar 11, said collar 14 adapted to remain stationary while the collar 11 and the socket 10 rotate. A plate 15 is formed upon the collar 14 and is adapted to be retained in a stationary position thereby; said plate constituting a supporting member for the timer mechanism. A ring 16 constructed of insulating material is mounted circumferentially upon the plate 15 and is rigidly secured thereto by means of the screws 17, which pierce said plate and said ring. A pair of binding posts 17<sup>a</sup> diametrically pierce the ring 16 and terminate at their inner ends in the contact plates 18, located upon the interior of said ring. The feed wires 19 of the ignition system are adapted to be secured to the binding posts 17<sup>a</sup> as clearly illustrated in Fig. 3.

A sleeve 20 is loosely mounted upon the shaft 13, said sleeve terminating at its lower terminal in an enlargement 21 which rests upon the upper terminal of the socket 10 and is located within the ring 16. This sleeve is provided with a spiral groove 22 therein, in which operates a pin 23 mounted upon a sleeve or collar 20<sup>a</sup> located between the shaft 13 and the sleeve 20. An enlargement 21 of the sleeve 20 has a pair of coinciding ears 24 formed upon one side thereof, and diametrically disposed thereto is formed and mounted an arm 25. The ears 24 have a lever 26 pivotally mounted therebetween, said lever having its inner terminal 27 bent to conform slightly with the curvature of the enlargement 21 and has its terminal alined with the arm or ear 25. A spring 28 is interposed between the terminal of the arm or ear 25 and the curved terminal of the lever 27, said spring tending to draw the opposite terminal of the lever 26 outwardly toward the ring 16. A contact wheel 29 is rotatably mounted at the outer terminal of the lever 26 and is adapted to, at all times, contact with the inner surface of the ring 16. As the wheel 29 passes over the contact plates 18, as will hereinafter be more fully described, the circuit is completed, during said passage, and is broken after the wheel breaks its contact with the plates 18. A washer 30 rests upon the enlargement 21 and encircles the sleeve 20, said washer having a plate 31 superposed thereon, said plate being supported by the set screws 32 to the ring 16.

The upper terminal of the sleeve 20<sup>a</sup> has a clamping bracket secured thereto, said

bracket having the diametrically disposed links 34 pivotally connected thereto. The upper terminal of the shaft 13 has a similar bracket 35 secured to the squared terminal thereof, by means of the screws 37. This bracket 35 has the diametrically disposed governor arms 38 pivoted thereto, carrying the governor weights 39 at their lower terminals, said weights being recessed as at 40 upon the inner surfaces, for the reception of the terminals of the bracket 33 to the links 34 when the weights are in their inoperative positions. The governor arms 38 are pivotally and centrally connected to the link 34. Therefore, as the governor arms are raised, due to the centrifugal force applied to the weights 39, the sleeve 20<sup>a</sup> causes the pin 23 to move upwardly in the spiral slot 22 of the sleeve 20, thus causing the latter to rotate at increased speed over the speed at which the engine is operated. When the speed of the engine decreases, and it is desired to lower the governor weights 39, a spring 41 is interposed between a washer 42 located adjacent to the bracket 35 and a washer 43 located adjacent to the bracket 33.

From the foregoing, it will readily be understood that, as the speed of the engine increases, necessarily the spark will be advanced to conform therewith, due to the centrifugal force thereof. This will draw the sleeve 20<sup>a</sup> upwardly, thus causing the sleeve 20 to rotate at an additional speed to the speed of the engine and causes the wheel 29 of the timer to contact with the contact plates 18 at an earlier period than by the ordinary rotation.

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

1. A spark advancing and retarding mechanism comprising a socket, means for connecting said socket to a cam shaft of an engine, a collar rigidly secured to the lower

end of the socket adapted to form a bearing, a second collar loosely mounted on the socket and adapted to bear on the first mentioned collar, a plate formed on the upper extremity of the second mentioned collar, an insulated ring rigidly secured to said plate, contact plates mounted in the ring, binding posts adapted to pass through said ring and connect with said contact plates, a timing shaft mounted on said socket and adapted to rotate therewith, a sleeve loosely mounted on said shaft and provided with an enlarged portion at the lower end thereof, said sleeve provided with a spiral groove therein, a second sleeve interposed between the timing shaft and the first mentioned sleeve, means for connecting said sleeve, a governor secured to the timing shaft and the second mentioned sleeve and means for guiding the weights of the governor.

2. A spark advancing and retarding mechanism, comprising a socket, an insulated ring, means for supporting said ring on the socket, a timing shaft mounted on the upper end of said socket, contact plates carried by said ring, binding posts connecting with the contact plates, a sleeve surrounding said timing shaft and provided with a spiral groove therein, a second sleeve interposed between the first mentioned sleeve, a lug adapted to project into said spiral groove, a governor attached in the second sleeve and to the timing shaft, ears formed on the lower end of the outer sleeve, a lever pivoted to one ear, a coil spring attached to the other ear and to the end of said lever, and a roller carried on the free end of the lever and adapted to bear against the insulated ring.

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

EDWIN L. PARDEE.

Witnesses:

CHRISTAIN SORENSEN;  
HANS CHRISTENSEN.