

A. F. ROCKWELL.  
SPARKING APPARATUS.  
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962,255.

Patented June 21, 1910.

Fig. 2.

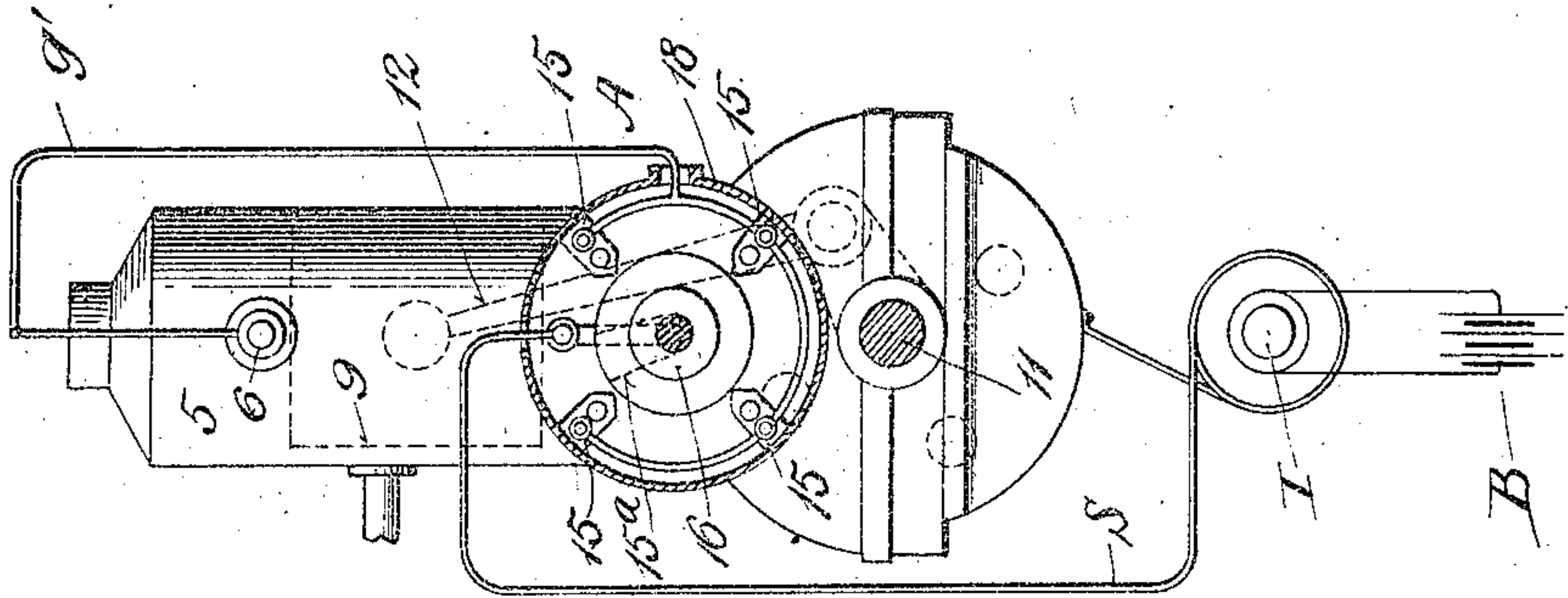
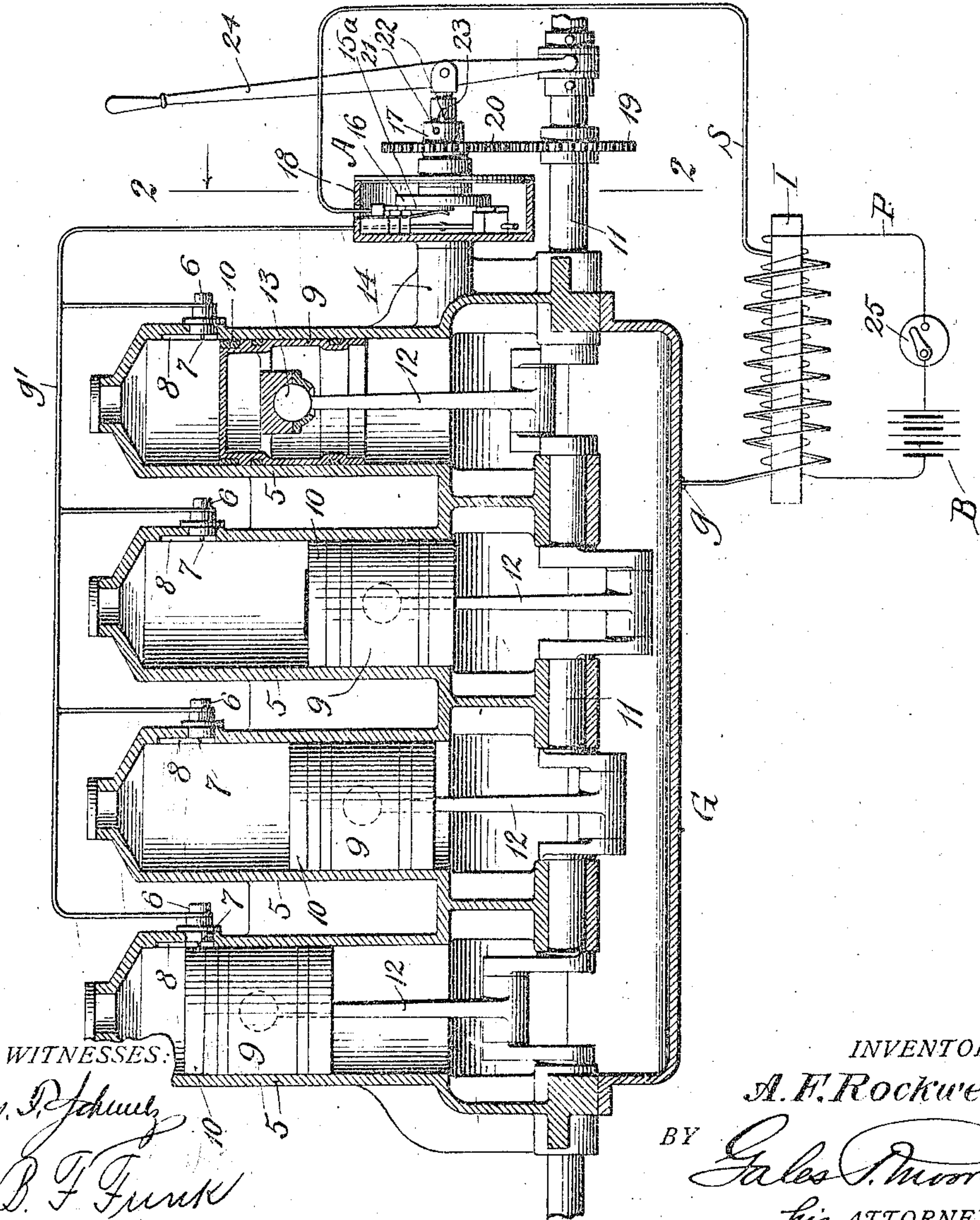


Fig. 1.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## SPARKING APPARATUS.

962,255.

Specification of Letters Patent. Patented June 21, 1910.

Application filed March 12, 1906. Serial No. 305,665.

*To all whom it may concern:*

Be it known that I, ALBERT F. ROCKWELL, a citizen of the United States, residing at Bristol, county of Hartford, State of Connecticut, have invented a certain new and useful Sparking Apparatus, of which the following is a full, clear, and exact description, 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, forming part of this specification.

This invention relates to sparking apparatus, adapted particularly for use in connection with explosion motors and the like.

In order to properly illustrate my invention I have shown it as including a plurality of sparking plugs, such, for example, as are used in connection with multiple cylinder engines, and inasmuch as the invention is applicable to any type of cylinder, I have deemed it unnecessary to illustrate any specific form of fuel supply, exhaust mechanism or air inlet, all of which are old and well known.

An object of my invention is to provide means whereby the sparking plug point will be kept free from corrosion, so as not to interfere with the proper electrical action when the piston is in its proper position for effecting the spark.

Another object of the invention is to provide means whereby a constantly changing surface on the piston may be presented to the spark plug point, so that a different part of the piston will be acted upon each time by the spark.

Another object of the invention is to provide a removable sparking surface carried by the piston, so that in the event that the wall of the piston becomes "pitted" a new surface may be provided without changing the entire piston.

It is also the object of my invention to arrange the sparking plugs in multiple, from a single conductor having a single source of generation, in circuit with which is means for advancing or retarding the spark at will.

Other objects and advantages as well as the novel details of construction of this invention will be specifically set forth hereinafter, it being understood that changes in form, proportion and minor details of construction may be resorted to without depart-

ing from the spirit of this invention or sacrificing any of the advantages thereof.

In the drawings: Figure 1 is a view partly in longitudinal section and partly in elevation of a motor provided with apparatus constructed in accordance with my invention; and Fig. 2 is a sectional view on the line 2-2 of Fig. 1.

In the drawings used to illustrate my invention, I have shown a motor as comprising a plurality of cylinders 5. These cylinders are provided with sparking plugs 6, one for each cylinder. The sparking plugs are constructed in the usual manner, being provided with spark points 7, in elongated recesses 8, which recesses are of sufficient size to permit the gas to be exploded in the pocket or recess 8, when the spark is made, in such a manner that the gas in each recess or pocket 8 will be permitted to escape therefrom when it is ignited, and in doing this the liability of corrosion or accumulation of any deposit on the sparking point will be avoided.

The pistons 9 are provided with removable sparking surfaces illustrated as comprising rings 10, which are carried by one end of each piston. Each piston is connected to the crank-shaft 11 by a piston-rod 12. The connection between the piston-rod 12 and the piston is shown as being of the ball and socket type, as shown at 13, see last cylinder from left to right, Fig. 1. By connecting the piston and its rod in this manner movement of the piston about its axis is permitted, so that a clean sparking surface will be presented to the spark plug during each explosion, thereby reducing the liability of the sparking ring becoming pitted, but if the ring does become pitted it may be readily removed and a new one put in its place. The electrode 7 is in the side of the cylinder and the piston reciprocates into and out of electrical proximity to said electrode, i. e., into and out of such position with respect to the electrode that the spark can occur. Manifestly, the reciprocation of the piston causes the side of the piston to be kept bright. Thus, by using the side of the reciprocating piston as one of the electrodes, I am enabled at all times to present a bright, clean electrode for coöperation with the spark point 7. The drawings show an arrangement whereby the pistons will consti-



tute one of the electrodes in each cylinder, the pistons being provided to co-act with the several sparking plugs, which sparking plugs are arranged in multiple and fed from  
 5 a common conductor, so that the plugs are at all times ready to coöperate with a piston which is in proper position with relation thereto to effect a spark. The arrangement  
 10 of the piston shown is such that a spark will be effected at about each quarter turn of the shaft, so that an impulse will be given to the shaft through a piston at about every 90 degrees.

I may utilize any generating medium for  
 15 supplying the current, such, for example, as a magneto or a battery B. The generator B may be in closed circuit with a conductor P of the primary of an inductorium I, the secondary S of which is shown as being  
 20 connected to the crank case G at  $g$ , the other lead  $g'$  being in circuit with the spark plugs which are connected in multiple. Interposed between the terminals of the lead  $g'$ , or in other words in circuit therewith, is a  
 25 circuit controller A carried on the bracket 14, and having a plurality of secondary contacts 15 electrically connected in series with that part of the lead  $g'$  interposed between the circuit controller and the spark  
 30 plugs. The portion of the lead  $g'$  leading from the inductorium to the circuit controller is connected to a rotatable disk 16, carried by a hollow shaft 17 journaled in the box or housing 18 of the circuit controller. The  
 35 disk 16 carries a metallic segment 15<sup>a</sup> adapted to successively contact with the secondary contacts 15 to cause a spark at suitable intervals. The shaft 17 may be driven from the shaft 11 through the medium of  
 40 the gears 19 and 20, the latter being carried by the hollow shaft 17 which is provided with a pin 21 projecting through a slot 22 in the slide 23 which is connected to the lever 24. Therefore, by operating the slide

23, the relative position of the contact 15<sup>a</sup> 45 with respect to the contacts 15 may be varied with the result that the spark may be advanced or retarded to suit varying conditions. If the source of generation is a battery, I may provide a switch 25 in the pri- 50 mary circuit, so as to open the primary circuit P when there is no need for the current, and this switch may be of any suitable construction.

It will be seen that by arranging the spark 55 plugs in multiple and in circuit at all times, it will be necessary only to permit a piston to come in proper relative position with relation to its spark plug in order to effect a spark, and as any number of spark plugs 60 may be arranged in multiple from a single line or conductor, it is obvious that the usual complicated wiring may be avoided.

What I claim is:

1. In a sparking apparatus, an electrode, 65 a piston movable toward and away from the same, said piston being rotatably mounted and shifting about its center of rotation as it moves toward and away from said electrode, and a sparking ring removably 70 mounted upon said piston and constituting the coöperating electrode; substantially as described.

2. A sparking circuit comprising a plurality of stationary electrodes, a single elec- 75 trical connection in communication with all of said electrodes; a plurality of rotatably mounted reciprocating pistons constituting coöperating electrodes for the first named electrodes, and a removable sparking ring 80 carried by each piston.

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

ALBERT F. ROCKWELL.

Witnesses:

B. F. FUNK,  
 H. W. TUTTLE.