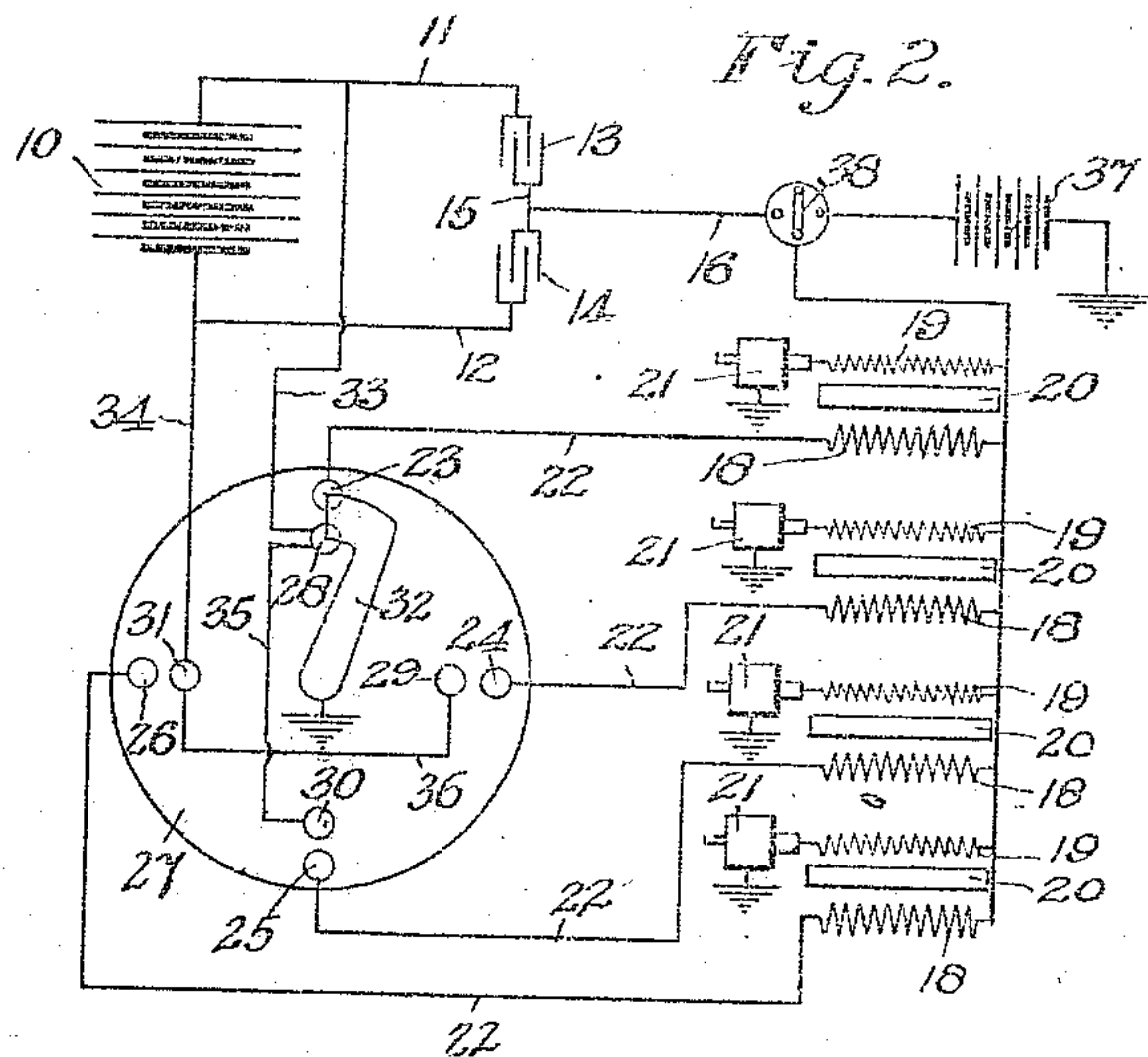
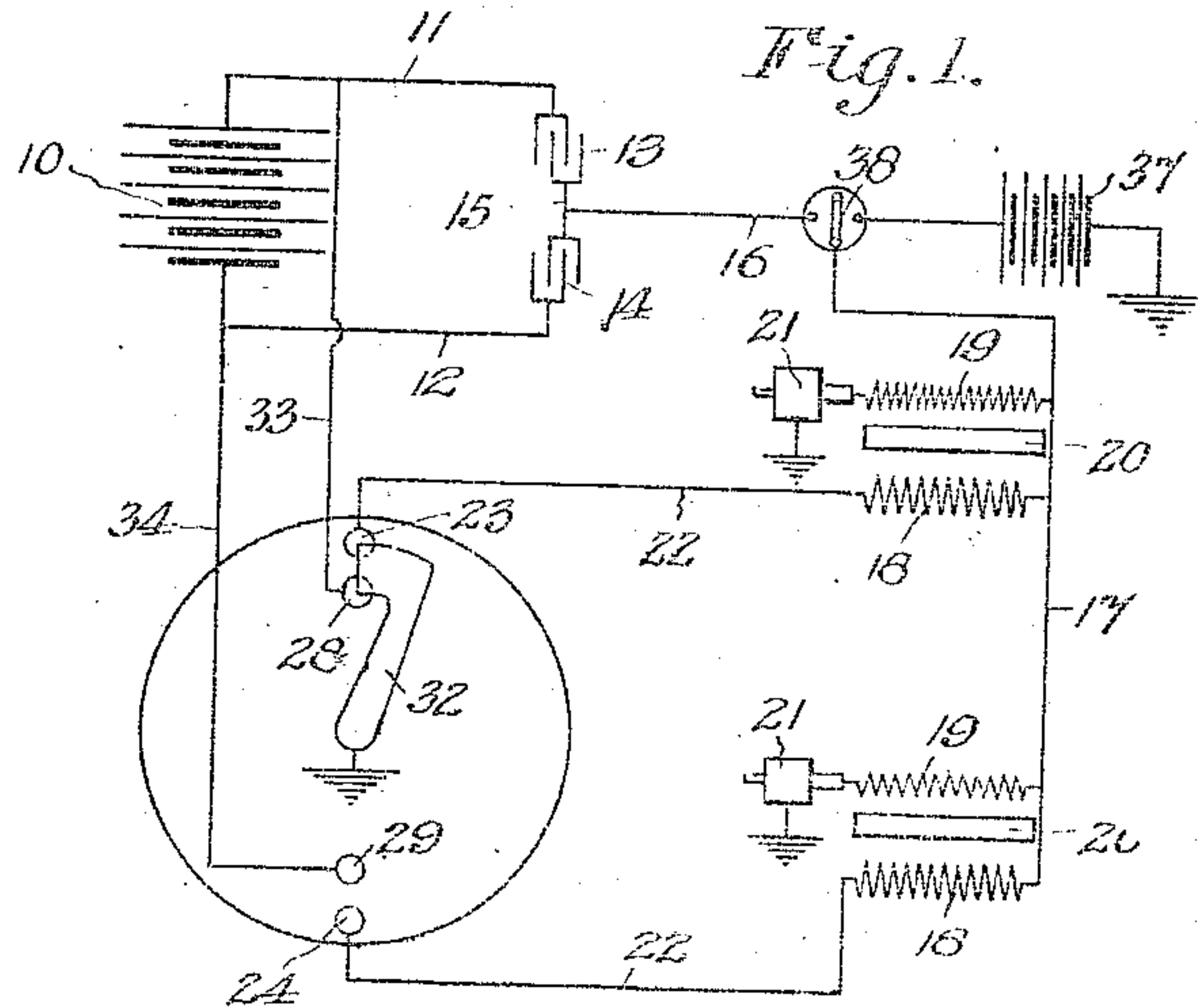


C. L. SILVA.
IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED FEB. 23, 1910.

995,490.

Patented June 20, 1911.



WITNESSES:

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CLAUDE L. SILVA, OF SAN DIEGO, CALIFORNIA, ASSIGNOR OF TWENTY-FIVE AND ONE-HALF ONE-HUNDREDTHS TO PERCY J. BENBOUGH AND FORTY-NINE ONE-HUNDREDTHS TO H. COON, JOHN A. GILLONS, CLAIR A. NELSON, N. H. HARGRAVE, W. V. O'FARRELL, D. A. GARRA, LYMAN P. OWEN, A. O. WALKER, N. D. KUHLMAN, F. M. MADISON, V. E. HAWKINS, I. T. BROCKETT, AND P. J. BENBOUGH, ALL OF SAN DIEGO, CALIFORNIA.

IGNITION SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

995,490.

Specification of Letters Patent. Patented June 20, 1911.

Application filed February 23, 1910. Serial No. 545,269.

To all whom it may concern:

Be it known that I, CLAUDE L. SILVA, a citizen of the United States, residing at San Diego, in the county of San Diego and State of California, have invented certain new and useful Improvements in Ignition Systems for Internal-Combustion Engines, of which the following is a specification.

My present invention relates generally to ignition systems for internal combustion engines and particularly to that character of system shown and described in my co-pending applications, and embodying twin condensers, alternate ones of which charge and discharge upon the make of each circuit through an igniting coil.

The object of my present invention is to provide an apparatus of the above character which may be installed in connection with the sparking coils now in use without splitting their bus bar, and with this in mind my invention resides in the features to be hereinafter described with reference to the accompanying drawing, forming a part of this specification, and in which,

Figure 1 is a diagram of my improved apparatus as applied to a two-cylinder engine, and, Fig. 2 is the same as applied to a four-cylinder engine.

Referring now to these figures, 10 represents a battery supplying a constant current of uniform potential through conductors 11 and 12 which are bridged by condensers 13 and 14, connected in series by a wire 15 from which a conductor 16 leads to the bus bar 17. Thus, initially, the potential in each of the condensers is equal to one-half that of the current supply means, or battery 10, which latter may, of course, be a generator to be driven without definite relation to the engine.

The conductors 11 and 12 lead current through the bus bar 17 to the primaries 18 of the sparking coils which induce into their respective secondaries 19 and raise the potential sufficient to cause a spark to jump the gap in their respective spark plugs 21. From the primaries 18, conductors 22 lead to the corresponding outer segments 23, 24, 25 and 26 of the timer 27 which has corresponding inner segments 28, 29, 30 and 31 and a brush

32 adapted to bridge each pair of inner and outer segments when it contacts therewith. Conductors 33 and 34 lead from conductors 11 and 12 to the inner segments 28 and 31 respectively, which are connected by wires 35 and 36 to their relatively opposite inner segments 30 and 29 respectively.

As the timer brush 32 rotates to the position shown it bridges the segments 23 and 28, thus placing the condenser 14 in circuit with the battery 10. This circuit may be traced as follows: from one pole of the battery 10 by conductors 11 and 33 to segment 28, through timer brush 32 to segment 23, by conductor 22 through coil 18, thence through bus bar 17 and conductor 16 to condenser 14, and thence by conductors 12 and 34 to the other pole of the battery. The condenser 14 therefore receives a charge equal to that of the battery potential. As the timer brush 32 continues to rotate it bridges the segments 29 and 24. This completes the circuit of the condenser 14 through the induction coil 18, causing the condenser to discharge into the coil. The circuit may be traced as follows: from the condenser 14 over conductor 16, bus bar 17, through coil 18, conductor 22, segment 24, timer brush 32, segment 29, and conductors 34 and 12 to condenser 14. As the potential of the condenser 14 falls, due to the last mentioned circuit, it causes, by induction, a current of sufficient potential to jump the gap in the plug 21. At such a time thereafter condenser 13 receives a charge from the battery 10 by the following circuit: from one pole of battery 10 by conductor 34 to segment 29, through timer brush 32 to segment 24, conductor 22, coil 18, bus bar 17, conductor 16, condenser 13, and by conductor 11 to the other pole of the battery. This places the condenser 13 in circuit with the battery, and it receives a charge equal to that of the battery potential. As the timer brush 32 continues to rotate, it again comes in contact with the segments 23 and 28, causing the condenser 13 to discharge into the coil 18, and the condenser 14 to receive a charge from the battery 10 through the following circuits: The current flows from condenser 13 over conductors 11 and 33 to segment

28, through timer brush 32 to segment 23, through conductor 22 to coil 18, through bus bar 17, and through conductor 16 back to the condenser 13. This circuit causes the potential of the condenser 13 to rapidly fall to zero, inducing a current in the secondary of the coil 18, which produces a spark in the plug 21. At such a time thereafter condenser 14 receives a discharge from the battery 10, the circuit being the same as the one first described. This raises the potential of the condenser 14 to that of the battery and completes the cycle. From this it will be seen that one condenser discharges its energy and the other charges, through the primary of a coil, upon the make of each circuit, with attendant advantages, for instance, demagnetizing the core 20 of the respective coil following induction, and obviating all arching incident to discharging upon the break. It will further be seen that this action takes place without splitting the bus bar and without mechanical devices depending upon proper adjustment for successful operation.

A dual or alternative system may be created by supplying a battery 37 to be cut into the conductor 16 by means of a mechanical switch 38, and with this arrangement, the system operates through the usual vibrators. With battery 37 cut out however, and the condensers operating, the discharge is so rapid that the vibrator has not time to oscillate, the advantage being that there is eliminated the time constant that every vibrator has, permitting synchronous sparking with relation to the position of the pistons of multicylinder engines.

I claim:—

1. In an electric ignition system, twin condensers connected in series, a charging circuit to which the free terminals of the condensers are connected, ignition coils having their primaries connected, respectively,

to opposite sides of the charging circuit, and each of said primaries being also connected to the neutral point of the condensers, and a timer in the circuits of the primaries, said timer being located between the primaries and their connections with the aforesaid charging circuit, for alternately closing the primary circuits.

2. In an electric ignition system, twin condensers connected in series, a charging circuit for said condensers, a conductor having a connection intermediate said condensers, ignition coils having one of their ends connected to said intermediate conductor, and a timer comprising contacts arranged in pairs, one of the members of each of said pairs being connected respectively to the other ends of the aforesaid ignition coils, and the other members of each of said pairs being connected respectively to opposite sides of the charging circuit, and a movable member successively bridging the members of the respective pairs of contacts.

3. In an electric ignition system, a source of electrical energy, conductors leading therefrom, twin condensers connected in series and bridging said conductors, a conductor having a connection intermediate said condensers, a timer having a pair of contacts for each of the igniting devices, and a brush to successively bridge each pair of contacts, ignition coils, each having connection with the aforesaid intermediate conductor, and each having a conductor connecting with one of its respective contacts, and conductors from the source of electrical energy to the other contacts.

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

CLAUDE L. SILVA.

Witnesses:

F. A. BARRON,
E. F. CAMP.