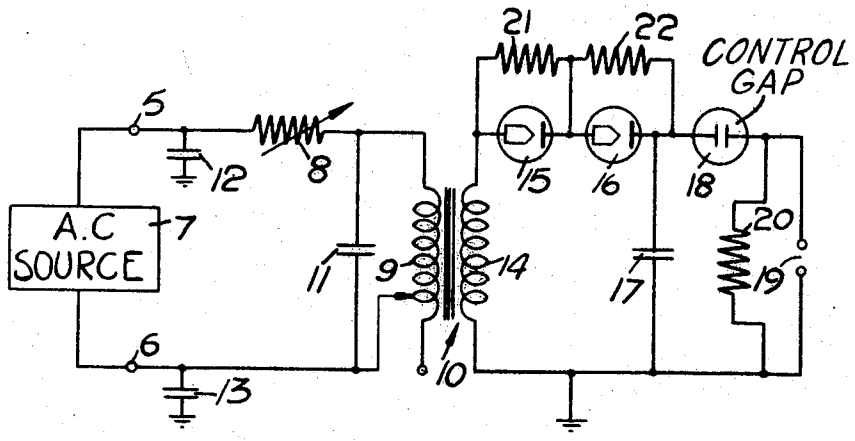
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A.C. OPERATED SPARK IGNITION APPARATUS WITH COMPENSATION FOR CHANGES IN THE FREQUENCY OF THE A.C. SOURCE

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A.C. OPERATED SPARK IGNITION APPARATUS WITH COMPENSATION FOR CHANGES IN THE FREQUENCY OF THE A.C. SOURCE

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ABSTRACT OF THE DISCLOSURE

A spark ignition transformer device having a capacitor in parallel with the primary winding, a resistor in series with the primary winding, and a spark gap in circuit with the secondary winding whereby variations in the spark rate due to variations in the source frequency and amplitude are stabilized.

This invention relates to spark ignition apparatus of the kind including first and second terminals which in use are connected to an A.C. source, an ignition transformer having the end of its primary winding connected respectively to the first and second terminals, a capacitor connected in series with one or more rectifiers across the secondary winding of the transformer, a control gap and a spark gap connected in series across the capacitor, and a resistor connected across the spark gap.

A disadvantage of such apparatus is that the spark rate varies with the amplitude and frequency of the output from the A.C. source, and the present invention seeks to reduce such variations.

According to the invention, spark ignition apparatus includes the components specified in the first paragraph of the specification, together with a resistor through which one end of the primary winding is connected to the first terminal, and a capacitor connected across the primary winding, the capacitance of the capacitor being such that at the nominal frequency of the A.C. source it forms a resonant circuit with the primary winding.

The accompanying drawing is a circuit diagram illustrating one example of the invention.

Referring to the drawing, there are provided first and second terminals 5, 6 connected to an A.C. source 7. The terminal 5 is connected through a variable resistor 8 to one end of the primary winding 9 of an ignition transformer 10 the other end of this winding being connected to the terminal 6. Moreover, the primary winding 9 is bridged by a capacitor 11, and the terminals 5, 6 are earthed through capacitors 12, 13 respectively.

The secondary winding 14 of the ignition transformer has its ends interconnected through a series circuit including a pair of rectifiers 15, 16 and a capacitor 17. The capacitor 17 is bridged by a control gap 18 in series with a spark gap 19, the spark gap being itself bridged by a protective resistor 20. Moreover, a pair of resistors 21, 22 are connected across the rectifiers 15, 16 respectively, and the end of the winding 14 which is connected directly to the capacitor 17 is earthed.

In use, the capacitor 17 is charged during alternate half-cycles of the A.C. source through rectifiers 15, 16 until the breakdown voltage of the control gap 18 is attained, at which point the capacitor 17 discharges through the spark gap 19. The capacitance of the capacitor 11 is so chosen that it forms a resonant circuit with the primary winding 9 at the nominal frequency of the A.C. source. Thus, at the nominal frequency the capacitor 11 has substantially no effect on the operation of the circuit. The resistors 21, 22 equalise the reverse voltage drops

across the rectifiers 15, 16, and also provide a safety slow leakage path for capacitor 17 which would otherwise be blocked by rectifiers 15, 16.

In the event of the frequency of the A.C. source rising, the capacitor 11 and primary winding 9 no longer resonate. In this case, increased current flows through the capacitor 11 and produces an increased potential drop across the resistor 8, reducing the potential applied to the primary winding of the transformer and so reducing the amplitudes of the half-cycles which charge the capacitor 17. Hence, the capacitor 17 requires more half-cycles to charge it to a value at which the gap 18 breaks down, but since the frequency of these half-cycles has risen, the overall effect is to reduce variations in the spark rate due to the increased frequency. Similarly, if the frequency of the source falls, the amplitudes of the half-cycles which charge the capacitor 17 increase and so fewer half-cycles are required to break down the gap 18. However, the frequency of the half-cycles has fallen, so once again the overall effect is to reduce variations in spark rate due to the change in frequency.

The variable resistor 8 permits the spark rate to be determined in production, variations in the value of resistor 8 effectively compensating for tolerations in other components. The capacitors 12, 13 are included to suppress radio interference.

Preferably, the terminal 6 can be connected to various points on the winding 9 as indicated by the arrow in the drawing. In production, this possible variation enables the resonant frequency to be set close to the supply frequency, so that compensation can be made for tolerances in the capacitor 11.

Although the circuit described is primarily designed to allow for frequency variations, it is also found to be less affected by voltage changes than conventional circuits.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. Spark ignition apparatus comprising in combination an A.C. source, first and second terminals connected to said source, an ignition transformer having a primary winding and a secondary winding, a capacitor and a rectifier connected in series across said secondary winding, a control gap and a spark gap connected in series across the said capacitor, a resistor connected across the said spark gap, a second resistor in series with said first terminal and one end of said primary winding, means connecting the other end of said primary winding to said second terminal, and a second capacitor connected across said primary winding, said second capacitor forming a resonant circuit with said primary winding at the nominal frequency of said A.C. source.

2. Spark ignition apparatus as claimed in claim 1 in which the resistor in series with the primary winding is variable.

3. Spark ignition apparatus as claimed in claim 1, in which the portion of the primary winding in the circuit is variable.

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