March 27, 1962 W. B. SMITS 3,027,493

IGNITION SYSTEM FOR GASEOUS AND/OR LIQUID FUELS

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FIG. 1

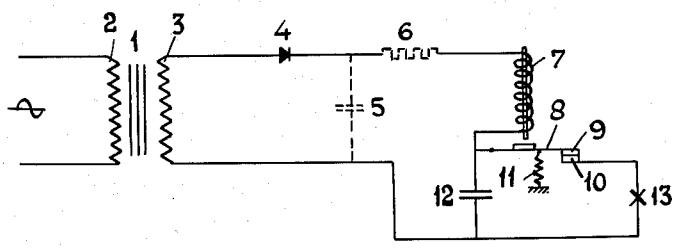
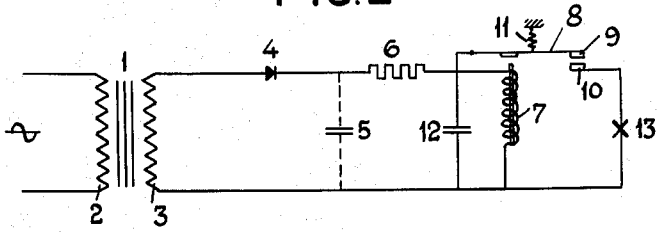


FIG. 2



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3,027,493

IGNITION SYSTEM FOR GASEOUS AND/OR LIQUID FUELS

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2 Claims. (Cl. 317—83)

The invention relates to an electric ignition system for gaseous and/or liquid fuels, for example, for gas turbines, oil-fired boilers, and the like.

Such ignition systems are usually connected to an A.C. supply main, the voltage of which is transformed to a high voltage, which is suitable for producing electric sparks on a torch with two pointed electrodes, connected to the secondary coil of the transformer. These systems involve the drawback that a high and dangerous voltage has to be operated with and the ignition of the gas or the liquid fuel cannot be sufficiently reliable, also because the plug electrodes are soon dirtied by deposited combustion residues of the injected fuel, in consequence of which the sparking action is reduced or even made altogether impossible. If the velocity of the air is too high, the high-voltage inductive spark is blown out.

The invention furnishes an electric ignition system which operates in a very reliable manner and in which under any circumstances an effective sparking action is ensured, while the working voltage employed is a low voltage, which consequently does not entail any danger.

The system according to the invention comprises a transformer to be connected to the available A.C. mains, which transformer charges an ignition condenser across a rectifier, and it is characterized by the fact that upon the charging of said condenser the gradual increase of the voltage and the decrease of the charging current will actuate a switch-device, which connects the condenser to the ignition plug of the torch.

This switch-device may be an electromagnetic relay, the excitation coil of which is connected in series with the charging circuit of the condenser in such a way that upon the charging of the condenser the contacts of the relay, one of which is connected to the plug, are opened, said relay being released when the voltage on the condenser rises to a given value, in consequence of which through the closing of the relay contacts the condenser is connected to the plug and discharges across the latter.

The excitation coil of the relay may also be connected in parallel with the ignition condenser, in which case during the increase of the charging voltage on the condenser, the relay contacts are opened, but are closed upon the attainment of a given voltage value on the condenser, because a larger current then starts flowing through the excitation coil, as a result of which the condenser is connected to the plug.

In the charging circuit, which includes a rectifier, a resistance may be connected in series with the condenser, the magnitude of which resistance conditions the number of sparks to be produced, also in connection with the capacity of the condenser. It is also possible for a so-called parent-condenser to be connected in parallel with the secondary coil of the transformer across a rectifier.

If it is to be possible for the system to be supplied from a D.C. mains, a periodically operating interrupter or a buzzer is incorporated in the usual manner in the primary transformer circuit.

The invention will be elucidated more fully with reference to the drawing showing two embodiments.

In FIG. 1 the reference number 1 designates a transformer primarily connected to an A.C. supply mains, which transformer is equipped with a primary coil 2 and a secondary coil 3, the voltage impulses of which charge an ignition condenser 12 across a rectifier 4 and the excitation coil 7 of an electromagnetic relay. If necessary, this secondary circuit may incorporate a resistance 6, the value of which conditions the number of impulses, whilst a parent-condenser 5 may be connected in parallel with the ignition condenser 12. The armature 8 of the relay is drawn by a spring 11 into a position such that in the position of rest the contacts 9 and 10 are closed and the condenser 12 is connected to the ignition plug 13. If one or more current impulses flow through the coil 7, the armature 8 is attracted and the condenser 12 is charged. When the charge of the condenser reaches a given value, the excitation of the coil 7 will become so slight that the drawing-force of the spring 11 exceeds the magnetic attraction, so that the armature 8 is released, the contacts 9 and 10 are closed, and the condenser 12 can discharge across the plug 13.

According to the wiring of FIG. 2 the excitation coil 7 is connected in parallel with the ignition condenser 12, and the contacts 9 and 10 are opened in the position of rest.

When the condenser 12 is gradually charged, the current-strength in the circuit 3, 4, 6, and 12 will decrease and the current through the coil 7 will increase.

As soon as the attraction of the relay, exercised on the armature 8, becomes greater than the drawing force of the spring 11, the relay will be attracted, the contacts 9 and 10 are closed, and the condenser 12 can discharge across the plug 13.

I claim:

1. An electric fuel ignition system comprising a low voltage spark plug, an alternating current source, a transformer having a primary winding connected to said source and a secondary winding connected to a condenser, current rectifying means connected between said secondary winding and said condenser to charge said condenser, and an electromagnetic relay provided with contacts and having its excitation coil connected in series with the charging circuit of said condenser, said contacts being normally closed and connecting said condenser to said spark plug, whereby when said condenser is charging said contacts are opened, said contacts closing upon the attainment of a predetermined voltage value to connect said condenser to said plug.

2. An ignition system according to claim 1 further comprising a resistance means connected in series with said rectifier means, the resistance value of which determines the number of sparks produced in relation to the capacity of said condenser.

References Cited in the file of this patent

UNITED STATES PATENTS

2,507,277	Smits	May 9, 1950
2,550,875	Smits	May 1, 1951
2,644,117	Schmitt	June 30, 1953
2,811,676	Smits	Oct. 29, 1957
2,887,592	Stout et al.	May 19, 1959

FOREIGN PATENTS

703,790	Germany	Feb. 13, 1941
788,829	Great Britain	Jan. 8, 1958