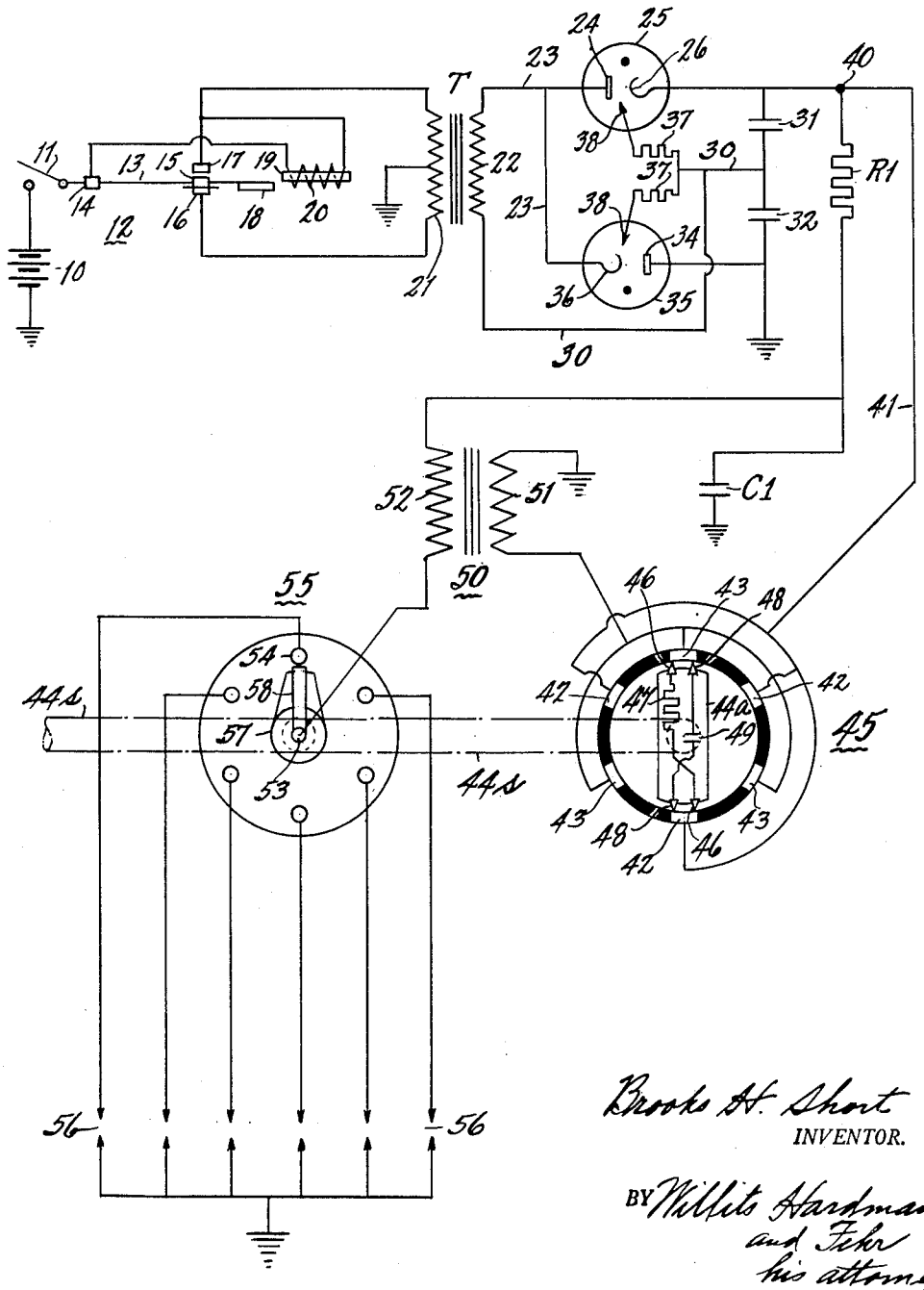
Dec. 8, 1953 B. H. SHORT 2,662,202

IGNITION SYSTEM

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IGNITION SYSTEM

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1 Claim. (Cl. 315—214)

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This invention relates to ignition apparatus for internal combustion engines and its object is to increase the heat of spark by increasing the duration of sparking by means of an auxiliary condenser which is charged between firing intervals and which is provided with a discharge path which occurs at a spark plug when a sparking voltage is induced in the secondary winding of an ignition coil.

In the disclosed embodiment of the present invention, this object is accomplished by the use of a source of high voltage D. C. current which has an output terminal connectable by a periodic engine driven circuit closer with the primary winding of a high frequency ignition coil whose secondary winding is connected by a distributor with the engine spark plugs. This output terminal is connected also through a resistance with one end of the secondary winding and with an auxiliary condenser which is charged between sparking intervals and which discharges across the gap of a spark plug which sparking is initiated by the discharge of high voltage induced in the secondary winding following interruption of the circuit of the primary winding.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

The figure of the drawing is a wiring diagram of the invention.

Referring to the drawing, a low voltage D. C. source, such as a storage battery 10, is connected by an ignition switch 11 with a vibrator 12 which includes a reed 13 connected at one end with a reed support 14 which provides a low voltage input terminal and carrying a contact 15 for engaging alternately side contacts 16 and 17 and carrying an armature 18 normally off-set from the core 19 of an electro-magnet coil 20 connected with contact 17 and terminal 14. Contacts 16 and 17 are connected with the ends of a primary coil 21 of a transformer T, the center tap of coil 21 being grounded. The secondary 22 of transformer T is connected with wires 23 and 30. Wire 23 is connected with plate 24 of cold cathode tube 25 and with cathode 36 of cold cathode tube 35. Cathode 26 of tube 25 is connected with output terminal 40 and with a condenser 31 connected by wire 30 with a grounded condenser 32. Plate 34 of tube 35 is grounded. Wire 30 is connected by resistance 37 with the teasers 38 of the tubes 25 and 35, the function

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of each teaser being to ionize the path between the plate and cathode of its tube. The elements 14—40 provide a power-pack which receives low voltage direct current from a source 10 and impresses high voltage D. C. on the terminal 40.

Terminal 40 is connected by a wire 41 with alternate segments 42 of a periodic current closer 45 having alternate segments 43 connected with the primary coil 51 of a high frequency ignition coil 50. An engine-driven shaft 44s drives a rotor 44a carrying a pair of contacts 46 connected by a resistor 47 and carrying a pair of contacts 48 connected by a condenser 49.

The secondary coil 52 of coil 50 is connected with the center contact 53 of a distributor 55 having posts 54 connected with engine spark plugs 56. Shaft 44s drives a rotor 57 carrying a conductor 58 connected with center contact 53 and operating to distribute sparking impulses to the spark plugs 56.

The rotors 57 and 44a are rotated counterclockwise. The pair of contacts 46 are the leading contacts with respect to the segments 42 and 43 which they connect. While contacts 46 are in engagement with segments 42 and 43, current increases in coil 51. When contacts 46 separate from the segments 42 and 43, contacts 48 remain in engagement with segments 42 and 43 so that condenser 49 is operative in conjunction with primary coil 51 to obtain a rapid reduction of primary current and coil flux to obtain a high voltage induced in the secondary coil 52 sufficient to cause sparking at a spark plug. The circuit of condenser 49 includes ground, primary coil 51, condenser 49, wire 41, terminal 40, and power supply.

During the interval between sparking impulses an auxiliary condenser C1 was charged by the power pack. When sparking occurs at a spark plug, a path for discharge of condenser C1 is provided. The discharge of condenser C1 prolongs the duration of sparking at the spark plug and substantially increases the heat of spark whereby adequate ignition can be provided at relatively high engine speeds.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

Ignition apparatus for internal combustion engines comprising a high voltage D. C. source having an output terminal, an ignition coil having primary and secondary windings, spark plugs, a distributor having posts connected re-

spectively with the spark plugs and having an engine driven rotor, a center contact, a conductor carried by the rotor for distributing sparking impulses to the posts from the center contact, a sparking impulse circuit which includes a spark plug, a post, the conductor, the center contact, the secondary winding of the ignition coil, a resistor in series with the output terminal, a primary circuit connected in parallel with the output terminal, and circuit including a periodic circuit closer having fixed segments alternate ones of which are connected as a group with the output terminal and alternate ones as a group with the primary winding of the ignition coil and having an engine driven rotor, two circuit connectors carried thereby for bridging, in sequence, between one each of the two groups of segments, the first of the connectors to be effective including a resistance and the last connector to be effective after the first has become ineffective including a condenser, the circuit of the last connector to be effective including ground, the primary winding of the ignition coil, the said condenser, the output terminal, said first-mentioned resistance, an auxiliary condenser and ground, and a discharge circuit of the auxiliary condenser which includes ground, said auxiliary condenser, the secondary winding of the ignition coil, the distributor and a spark plug to ground.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,489,780	Hooven	Nov. 29, 1949
2,536,143	Short	Jan. 2, 1951