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HIGH VOLTAGE CURRENT DISTRIBUTING APPARATUS FOR THE ELECTRIC IGNITION APPARATUS OF INTERNAL COMBUSTION ENGINES.

APPLICATION FILED MAY 13, 1919.

1,335,933. Patented Apr. 6, 1920.

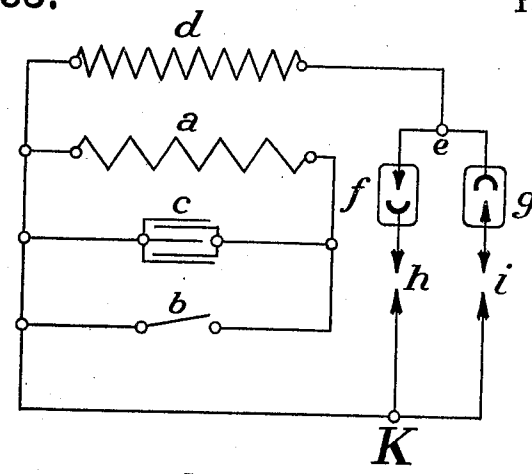



Fig.1

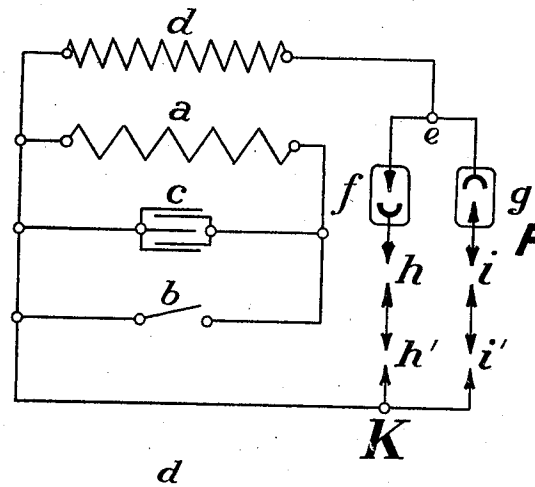



Fig.2

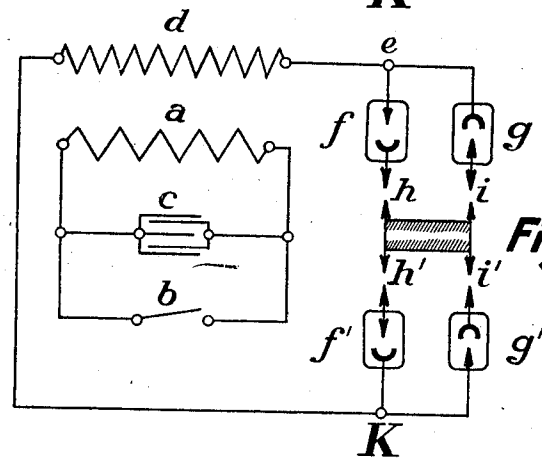



Fig.3

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## HIGH-VOLTAGE-CURRENT-DISTRIBUTING APPARATUS FOR THE ELECTRIC IGNITION APPARATUS OF INTERNAL-COMBUSTION ENGINES.

1,335,933. Specification of Letters Patent. Patented Apr. 6, 1920.

Application filed May 13, 1919. Serial No. 296,762.

*To all whom it may concern:*

Be it known that I, JACQUES BOHLI, a citizen of the Swiss Republic, residing at Obach, Solothurn, Switzerland, have invented certain new and useful Improvements in High-Voltage-Current-Distributing Apparatus for the Electric Ignition Apparatus of Internal-Combustion Engines, of which the following is a specification.

In high voltage ignition apparatus for internal combustion engines the distribution of the high voltage current to the several engine cylinders has been effected hitherto by closing alternately the ignition circuits of the several cylinders by means of mechanically actuated devices.

The present invention has for its object to enable the motion of mechanical devices for this purpose to be dispensed with in the ignition of internal combustion engines, and to effect the distribution by purely electrical means in systems employing a magneto or other alternating current generator. This is done by arranging the points of ignition for the several engine cylinders in two ignition circuits which are connected to each other in parallel and which include devices that allow the current to pass through only in one direction, and are so constructed as to allow of the current passing through the two ignition circuits in mutually opposite directions.

Since voltage waves are generated in alternately opposite directions by the ignition apparatus, an ignition current will flow in one of the two ignition circuits only when the voltage at the high voltage terminals of the apparatus acts in one direction, and will flow in the other ignition circuit only when the voltage is acting in the opposite direction. Consequently ignitions at different ignition points will take place in succession or simultaneously according as these ignition points are situated in different ignition circuits or in one and the same ignition circuit.

Constructional forms of this invention are illustrated by way of example in the accompanying diagrammatic drawings in which:—

Figure 1 illustrates an improved apparatus according to this invention for distributing high voltage current to two-cylinder engines. Figs. 2 and 3 illustrate modifications of this invention applied to a four-cylinder engine. The ignition apparatus comprises in the usual manner a low-voltage coil *a*, a condenser *c* and interrupter *b*, and a high-voltage coil *d* at the ends of which latter the ignition circuits are connected to the sparking plugs *h* and *i*. These ignition circuits are connected to each other in parallel at the points *e* and K.

Each of these ignition circuits includes a device *f* and *g* respectively, which acts in the manner of a rectifier. These devices are connected to the circuits in such a way that the device *f* is connected by way of its cathode to the sparking plug *h*, while the other device *g* is connected by way of its anode to the sparking plug *i*.

According as the current waves emanating alternately in opposite directions from the high tension coil, flow from the point *e* of the circuit toward or away from the sparking plugs, they will pass through the circuit of the sparking plug *h* or through the circuit of the sparking plug *i*, and in this manner produce the successive ignitions alternately in the two cylinders of the engine.

For producing ignitions alternately in four-cylinder engines, an arrangement may be employed as shown in Fig. 2. In this figure corresponding parts are indicated by the same letters as in Fig. 1.

In each of the circuits (that are connected to each other in parallel between the points *e* and K) there is included a pair of sparking plugs *h h'* and *i i'* respectively, in addition to a rectifier *f* and *g* respectively. The two pairs of sparking plugs receive current in alternate succession.

Igniting sparks are produced simultaneously at the two sparking plugs of each respective pair *h* and *h'* and *i* and *i'*. Of these sparks one serves for ignition while the other is unused, according to the phase of the working operations in the respective cylinder.

The connection of the sparking plugs *h* and *i* between the rectifiers *f* and *g* on one hand, and of the sparking plugs *h'* and *i'* on the other hand necessitates a special con-

struction of the two first-mentioned sparking plugs with insulated electrodes on both sides.

If instead of sparking plugs of special construction it is desired to employ the ordinary type of sparking plug wherein one electrode is situated on the frame, then a mode of connection of the kind illustrated in Fig. 3 may be used. In this arrangement two pairs of rectifiers $f$, $g$ and $f'$ $g'$ are respectively inserted on either side of the circuits that are connected in parallel with each other at the points $e$ and K. One electrode of each of the sparking plugs $h$ $i$ and $h'$ $i'$ are connected respectively to these circuits, whereas the other electrode is situated on the frame of the apparatus. In this case the circuit of the low-voltage coil $a$ with the condenser $c$ and interrupter $b$ must be insulated from the high-voltage circuit of the sparking plugs.

What I claim is:—

In a high-voltage current distributing apparatus for the electric ignition apparatus of internal combustion engines, the combination of two ignition circuits connected to each other in parallel, two ignition points for each engine cylinder located respectively in said two ignition circuits, and two current-rectifiers located respectively in said two ignition circuits, so connected and operating as to cause said two ignition circuits to allow the igniting current to flow in them in mutually opposite directions.

In testimony whereof I have signed my name to this specification.

JACQUES BOHLI.