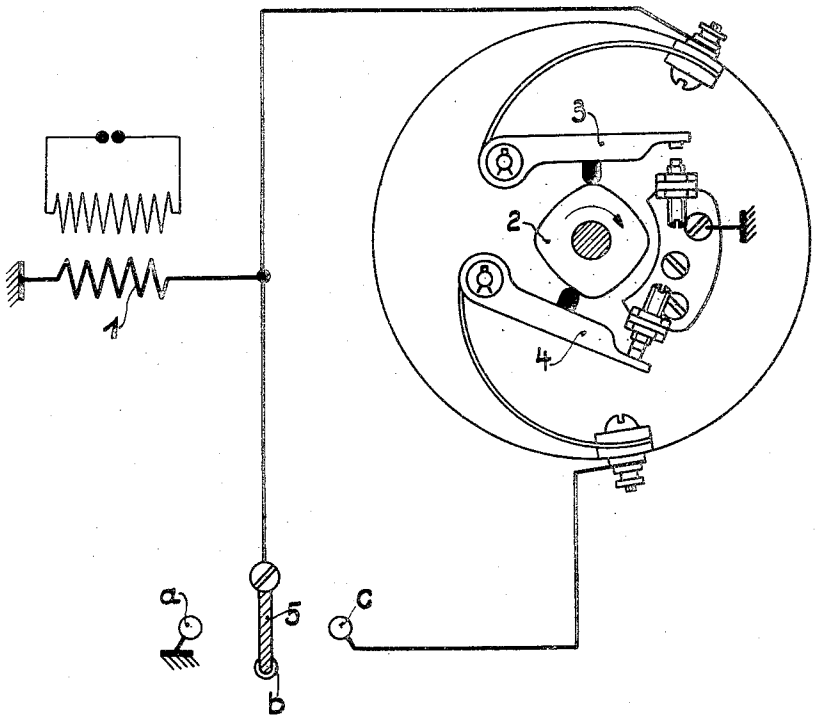
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IGNITION CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES

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Inventor
Erich Klaiber
by Stewart & McKay
his attorneys

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ERICH KLAIBER, OF STUTTGART, GERMANY, ASSIGNOR TO ROBERT BOSCH AKTIENGESELLSCHAFT, OF STUTTGART, GERMANY

IGNITION CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES

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In certain cases, for example in aircraft having a number of engines distributed over the aircraft, it is inconvenient and difficult to lead a long rod from the driver's seat to the ignition apparatus for adjustment of the ignition timing. Automatic adjustment in the ignition apparatus renders this heavier and is therefore frequently a matter of great consideration. Thus for example in a three-engined aircraft the weight of six automatic adjustment devices has to be considered since as a rule each engine is fitted with two ignition apparatuses.

This disadvantage is overcome according to the invention by providing two contact breakers for the ignition apparatus of each engine, one of which is permanently set at advanced ignition and the other at retarded ignition by which means a change can be made from advanced ignition to retarded ignition by switch means which in one form of construction connects up the contact breaker set at retarded ignition in parallel with the other.

The two contact breakers may be combined in a single apparatus which may also be arranged so that each ignition apparatus is provided with two contact breakers, one of which is set at advanced ignition and the other at retarded ignition.

One form of ignition control apparatus according to the invention is shown in the accompanying drawing.

The primary winding 1 of an ignition apparatus is connected at one end to earth and at the other with a contact breaker 3, actuated by a cam 2, which is permanently set at advanced ignition. A second contact breaker 4 is also provided and is operated by the same cam 2 and permanently set at retarded ignition. The point of connection of the primary coil with the contact breaker 3 is led to the arm of a change-over switch 5 which can be alternately placed on three contacts *a*, *b* and *c*. The contact *a* is earthed, the contact *b* is insulated and the contact *c* is connected with the contact breaker.

The period of closure of the two contact breakers is adjusted so that they mutually over-lap.

When the engine is running with advanced ignition the arm of the change-over switch is placed on the contact *b* and consequently only the contact breaker 3 operates, i. e. the apparatus works with advanced ignition. If for example when running free a change is to be made to retarded ignition the changer-over arm is set on the contact *c*. The opening of the primary circuit is then determined by the contact breaker 4 and the ignition apparatus gives retarded ignition. On placing the changer-over arm on the contact *a* the ignition apparatus is short-circuited in the usual manner.

I claim:

1. Ignition control apparatus for internal combustion engines comprising at least two contact breakers adapted to open successively, a source of current in series with the advanced contact breaker in a normally operative circuit and means for at will connecting the retarded contact breaker in parallel with said advanced contact breaker in said circuit.

2. Ignition control apparatus for internal combustion engines comprising at least two contact breakers, a common cam adapted to open said contact breakers successively, a source of current in series with the advanced contact breaker in a normally operative circuit and selective switch means for at will connecting the retarded contact breaker in parallel with said advanced contact breaker in said circuit.

3. Ignition control apparatus for internal combustion engines comprising at least two permanently set contact breakers adapted to open one in advance of the other, a normally operative circuit including in series circuit relation a primary induction coil, a source of current and a contact breaker permanently set at advanced ignition, and selective switch means for connecting the other contact breaker in parallel with said advanced contact breaker in said normally operative circuit.

4. Ignition control apparatus for internal combustion engines comprising at least two contact breakers adapted to open successively, each comprising fixed and movable contact elements, a normally operative circuit including in series relation an induction coil,

a source of current, and the advanced contact breaker, a rotatable switch arm connected to said circuit at a point between said coil and said contact breaker, said fixed contacts being connected to earth, said switch arm being provided with an insulated contact stud, a grounding contact stud, and a third contact stud connected to the movable contact of said retarded contact breaker.

5. The method of varying the ignition timing in internal combustion engines which consists in normally interrupting the primary current by an interrupter having advanced timing, and shunting said interrupter by a second interrupter having retarded timing.

6. Ignition control apparatus for internal combustion engines comprising two contact breakers, a normally operative ignition circuit including one of said contact breakers set to produce advanced ignition in said engine, said second contact breaker being set to produce retarded ignition when connected in said circuit, and means for at will connecting said second circuit breaker in parallel with the first breaker in said circuit.

In testimony whereof I have hereunto affixed my signature.

ERICH KLAIBER.