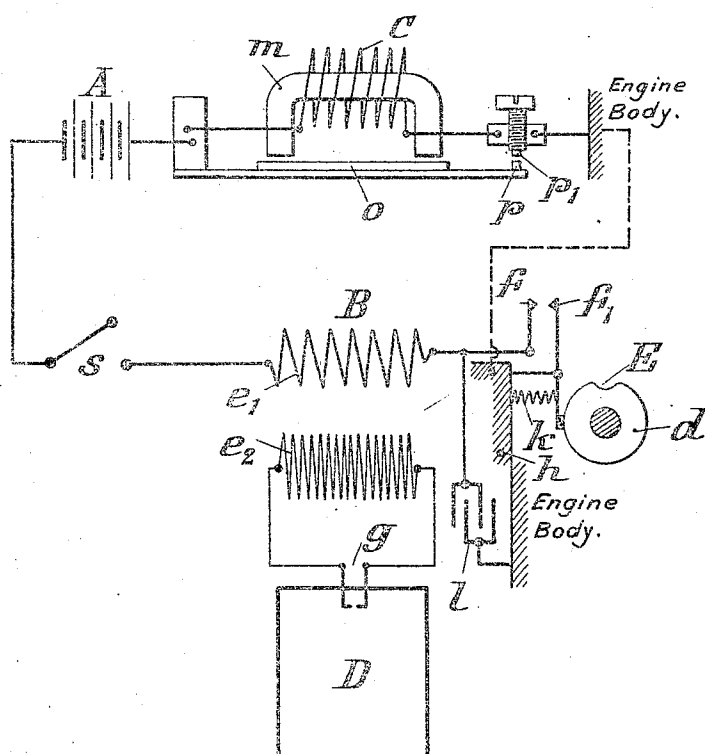


F. KRATZ.
ELECTRIC CURRENT INDICATOR.
APPLICATION FILED NOV. 18, 1910.

1,048,179.

Patented Dec. 24, 1912.



WITNESSES

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ELECTRIC-CURRENT INDICATOR.

1,048,179.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed November 13, 1910. Serial No. 592,978.

To all whom it may concern:

Be it known that I, FRANZ KRATZ, a subject of the Emperor of Germany, residing at No. 59^a Schlossstrasse, Stuttgart, Germany, have invented certain new and useful Improvements in Electric-Current Indicators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to apparatus for indicating whether or not current is flowing in an electrical circuit.

In electrical sparking devices for automobiles, for example, it very often happens that the operator forgets to cut off the ignition battery upon stopping the car, and then if some time elapses before operation is resumed, the battery may be entirely exhausted by the continuous flow of current from the battery.

The invention consists in locating at a suitable place a buzzer of the usual type, for instance a Wagner hammer buzzer. The buzzer is connected in the conductor in which the current flow is to be indicated, so that the opening and closing of the buzzer contact does not interrupt the flow of current in the conductor. This is accomplished by connecting the vibrating armature which carries the movable buzzer contact in parallel with the winding of the buzzer, so that a closed circuit always exists whether the armature of the buzzer is attracted by the electromagnet or not. When the armature is not so attracted the current flows through the electromagnet winding, and when the armature is so attracted the current flows through the vibrating armature and the buzzer contacts. In this way the movement of the armature periodically shunts the current from the electromagnet winding. This special manner of connecting the buzzer is particularly important for sparking devices for internal combustion engines, because every interruption in the continuous supply of the current occasions the production of a spark at the ignition plug, which is prejudicial for the reason that the spark would occur when ignition is not desired.

The accompanying drawing forming a part of this specification is a diagrammatic view showing the connections of the buzzer in accordance with the invention.

A is a battery, B a spark coil of well known construction, having a primary winding e_1 and a secondary winding e_2 . The buzzer C consists, as usual, of the electromagnet m , the vibrating armature o and the contacts p and p_1 .

The secondary winding e_2 is connected to the spark plug g in the engine cylinder D. In the electric connections between the battery A and the primary e_1 , is inserted a switch s , which is closed in ordinary operation. The other end of the primary winding e_1 is connected to the stationary contact f of the mechanically actuated interrupter E. The movable contact f_1 of the interrupter is fastened on a lever pressed by the spring k against the cam d driven by the engine in the usual manner. The stationary contact f is connected to a suitably grounded part, as the engine body indicated, through the condenser l ; and the movable contact f_1 is electrically connected through a grounded part to the contact p_1 of the buzzer C.

The battery current passes to the engine body alternately through the winding of the electromagnet and the vibrating armature in parallel with the winding. Therefore, as long as the electrical connection from the battery is not interrupted, the buzzer will be in action. However, when the vibrating armature is not able to follow the oscillation of current produced in the winding of the electromagnet by a mechanically actuated interrupter, for instance, the buzzer will stop, which condition occurs when the number of interruptions is very great. Therefore, when the engine is running the mechanical interrupter prevents the operation of the buzzer. However, if the mechanically actuated interrupter stops entirely, as at standstill of the engine, the current flowing continuously from the battery causes the buzzer to operate. Therefore, if the buzzer is located, for instance, on the dashboard of an automobile, the operator, upon leaving the car, will be reminded by the operation of the buzzer that the battery is still in circuit.

Having thus described my invention, what I claim is:

1. In combination with an electric circuit through which current flows, a current indicator comprising a buzzer having a winding permanently connected in said circuit and a vibratory armature in electrical parallel with the winding, and a periodically inter-

rupting device which, during operation, periodically interrupts said current with such frequency as to prevent the vibration of said armature and which, during cessation, maintains said circuit continuous thereby allowing said armature to vibrate to indicate the continued flow of the current therein.

2. In an electric ignition system for internal combustion engines, the combination with a spark plug, a source of ignition current, and circuit connections therefor, of a buzzer in said circuit and an interrupter which periodically interrupts said circuit with such frequency as to prevent the operation of said buzzer and which, during cessation, allows said buzzer to operate; substantially as described.

3. In an electric ignition system for in-

ternal combustion engines, the combination with a spark plug, a source of ignition current, and circuit connections therefor, of a buzzer in said circuit having a winding and a vibratory armature in electrical parallel with the winding, and an interrupter which periodically interrupts said circuit with such frequency as to prevent the operation of said buzzer and which, during cessation allows said buzzer to operate; substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

FRANZ KRATZ.

Witnesses:

MAX ANSCHUTZ,
REINHOLD ELMERT.