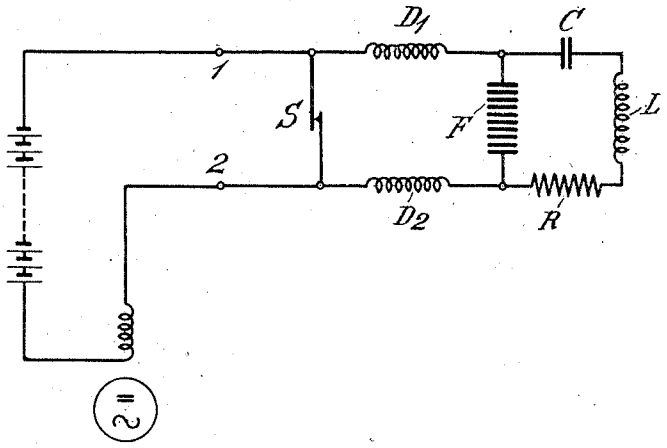
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ENERGY ABSORPTION MEANS FOR SWITCHING CONTACTS

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## ENERGY ABSORPTION MEANS FOR SWITCHING CONTACTS

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As is well known, two kinds of energy must be taken up by the switch when cutting out a circuit. One of them is purely ohmic energy, which is relatively slight and which, in general, will offer no difficulty. There is trouble, however, as soon as it is desired to cut out a circuit containing inductance. Through the inductances situated in the network circuit heavy super-tensions are produced at the switching contacts during cutting out, which will tend to cause a luminous arc between the contacts. In order to keep this inductive energy from the switching contacts it has been suggested to connect some capacities in parallel with the contacts. However, as Rüdenberg states in his work on, "Elektrische Schaltvorgänge", on page 140, large condensers are required for obtaining slight tensions at the switching contacts. But condensers of this kind are difficult to construct for the required tensions and in consequence they are expensive.

The inconveniences referred to may be avoided in that according to the invention a spark extinguishing gap is connected in parallel with the switching contacts, which gap or distance proper will again act upon an oscillatory circuit connected to it. The tension requisite for penetrating the sparking gap must be chosen to be a small degree higher than the tension at the contacts while the switch is open, in order to avoid actuation of it during the opening period of the switch.

In the drawing one mode of execution of the device according to the invention is illustrated diagrammatically by way of example.

By means of the switch S a circuit connected to the terminals 1 and 2 is cut in. In parallel to the switching contacts is connected a spark extingushing gap F by way of the two choke coils $D_1$ and $D_2$. The spark extinguishing gap proper is situated in an oscillatory circuit, formed by a capacity C, an inductance L and a damping resistance R. When opening the switch the high tension referred to above caused by the inductances of the circuit connected to the terminals 1 and 2 will be produced at the switching contacts and actuate the sparking gap F. Owing to this the oscillations in the circuit L C R are initiated and the energy in the said circuit is destroyed. In order to keep the high frequency oscillations produced, away from the circuit connected to the terminals 1 and 2, two high frequency choke coils $D_1$ and $D_2$ are introduced between the spark extinguishing gap F and the switching contacts. By the arrangement referred to the formation of sparks at the switching contacts during the opening of the switch is fully prevented. It has been proposed however, to connect oscillatory circuits in parallel to the switching contacts, but on the one hand it is necessary to tune the circuits, in order to prevent the tensions at the switch growing inadmissibly high, and on the other hand this requirement cannot be fulfilled, owing to the oscillations being again dependent on the condition of the switching contacts, whose surface naturally is subject to constant changes.

Through the destructions in consequence of the slight luminous arcs, which will also occur with new switching contacts and an oscillatory circuit tuned in conformity with them, the contacting surface is gradually injured from one switching operation to the other and ultimately the surfaces of the contacts become so highly changed, that the tuning of the oscillatory circuit is no longer correct.

With the arrangement according to the invention however, the switching contacts are not situated within the oscillatory circuit and in consequence they do not partake in the oscillatory motion and thus do not determine the frequency of the latter, but the high frequency oscillations are determined through the spark extinguishing gap F, while at the contacts only slight tensions will occur.

I claim:

1. In combination with an electric circuit having switching contacts therein, a spark extinguishing gap connected in parallel to the switching contacts and shortcircuited thereby with the switching contacts closed, and an oscillatory circuit containing an inductance, a condenser and the spark extinguishing gap connected in series, whereby when the switching contacts are opened the high tension currents across the contacts are dissipated in the series oscillatory circuit.

2. A combination according to claim 1 wherein a damping resistance is connected in series with the other elements of the oscillatory circuit.

3. The combination according to claim 1 wherein a damping resistance is connected in series with the other elements of the oscillatory circuit and wherein high frequency choke coils are connected between the switching contacts and the spark extinguishing gap to keep out of the electric circuit high frequency oscillations set up in the oscillatory circuit when the switching contacts are opened.

In testimony whereof I have affixed my signature.

KARL SCHMIDT.