Contactless Charge of an Accumulator and High Voltage Supply of Lighting Lamps from Invertor class "E"

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Abstract - **Tests have been carried out with an inductive cummulation generator, aimed to charge accumulator batteries of small capacity (Mobil phones and portable instruments with accumulator batteries). An aid invertor of the same type supplies high voltage to a lighting lamp. The generator is a one-switch invertor which belongs to the category of generators with inductive cummulation and zero commutational voltage. An inductive link with the load has been used.**

Key words: **Accumulator 6V; 4,5Ah, Mobil device PHILIPS – NiMH, Portable boring machine with an accumulator battery 3,6V; 1,2Ah, High frequency supply of high voltage to lighting lamps.**

I. INTRODUCTION

Invertors are sources of high frequency power and the total effect and the efficiency of the supplied by them devices depend on their power. The traditional invertors accumulate after their start power in capacity or capacitance predominating circuit. In the used invertor the power is cumulated in inductivity and capacity fulfils other power and stabilizing functions. The typical for the other invertors transient process lacks in it because it is started and works directly in a steady state regime. The generator is a one-switch inventor.

II. SCHEME

The scheme of the charging generator is shown in fig.1. A timer controlled transistor is used as a key element. The inductive and capacitive elements of the circuit are in conformity with the respective load and working frequency of the timer.

III. TESTS

A. Акумулатор 6V , *4,5Ah*

A contactless charge at $I_{ch.eff}$ = 0,48A has been carried out.

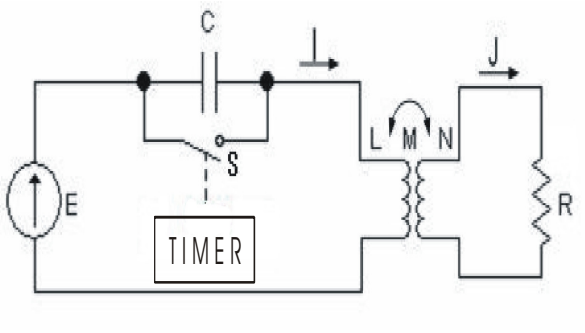

Fig. 1

The time diagrams of the voltage are shown in fig. 2.

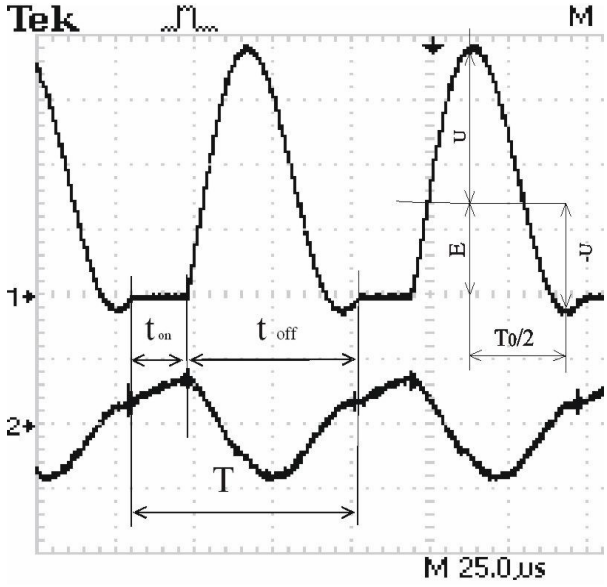

Fig. 2

The working frequency is f_p = 26,3kHz, supply voltage is U = 32,3V.

B. Mobil phone

Mobilphone – PHILIPS with a battery NiMH – 4,8V. Supply parameters: U_{ch} = 6,5V, at $I_{ch.eff}$ = 150mA. Working frequency f_p = 33kHz. The time diagrams of the voltages are shown in fig. 3.

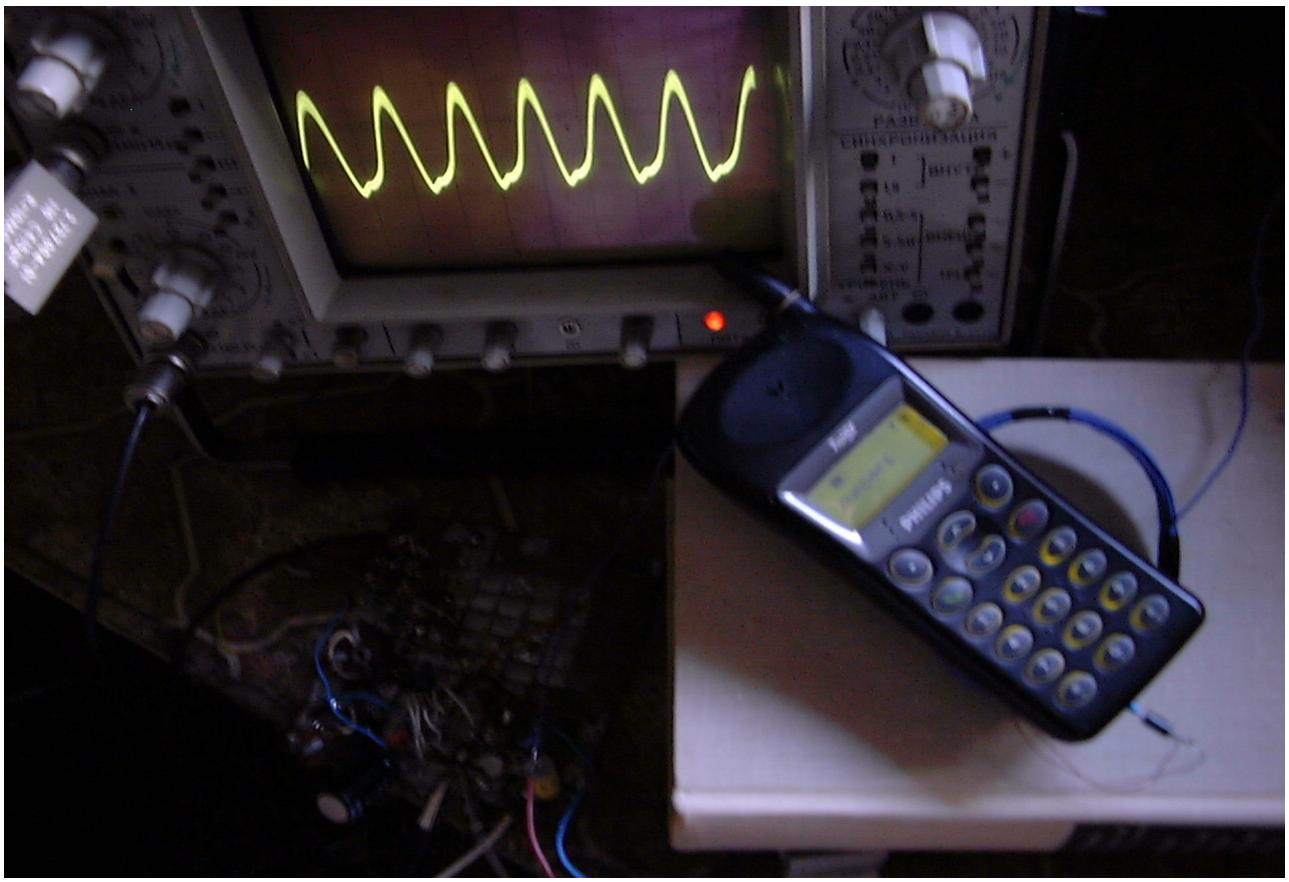

Fig. 3

In the picture of fig.3 the handy device is in a charge regime. In the top left corner of it's display an activated charge indicator can be seen. The lighting is also activated. The handy device is upon a bobbin-inductor, part of it can be seen on the right. It is obvious that a diode connected with the receiving winding bobbin, has been plugged in the supply socket.

Both windings which carry out the necessary magnetic link for the charge process can be seen in the picture – fig.4, when the handy device is turned over. You can also see the stuck receiving winding on the handy device back. The connection of the bobbin by a diode to the handy device charge box can be seen as well.

A professional decision can build the receiving winding in the handy device body like it has been done in the following development.

C. Portable boring machine

A portable boring machine with accumulator batteries – 3,6V, 1,2Ah. Supply parameters: U_{ch} = 5,1V, $I_{ch\ eff.}$ = 80mA. Working frequency f_p = 26,3 kHz. The time diagrams of the voltage are shown in fig.5.

In the picture the boring machine handle is put in the inductor. The necessary magnetic link is achieved and the instrument is in a charge regime. The activated red-lamp indicator can be seen which means that a charge process is available. The receiving winding is built in the handle where the accumulators are as well.

A professional development can constructively design the inductor and the operative invertor class E in a comfortable support nest in which the charged instrument will lie.

D. High frequency supply of lighting lamps with high voltage.

A sodium lighting lamp of 50W power has been supplied. The invertor working frequency is 20 kHz In the picture of fig. 6 the lighted lamp can be seen and fig. 7 – it's reflexion on the oscilloscope display. The time diagrams of the working and control voltage can also be seen in the pictures.

Fig. 4

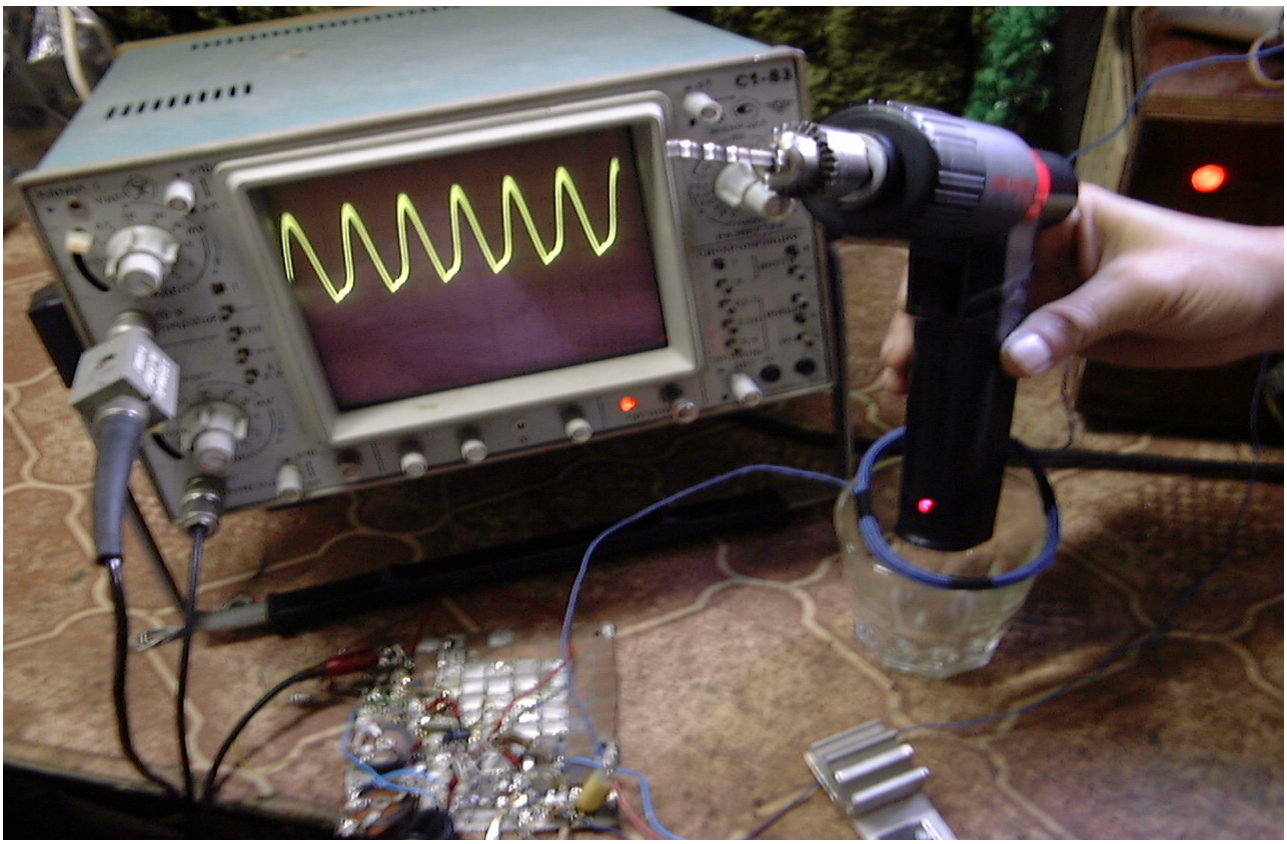

Fig. 5

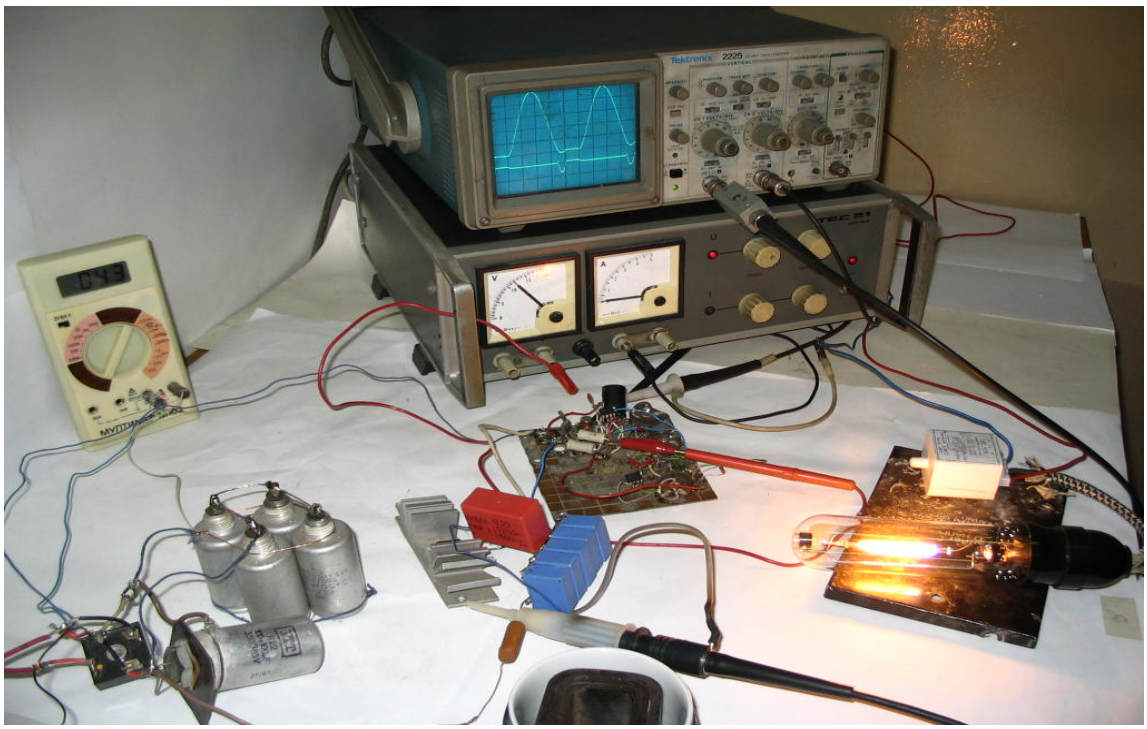

Fig. 6

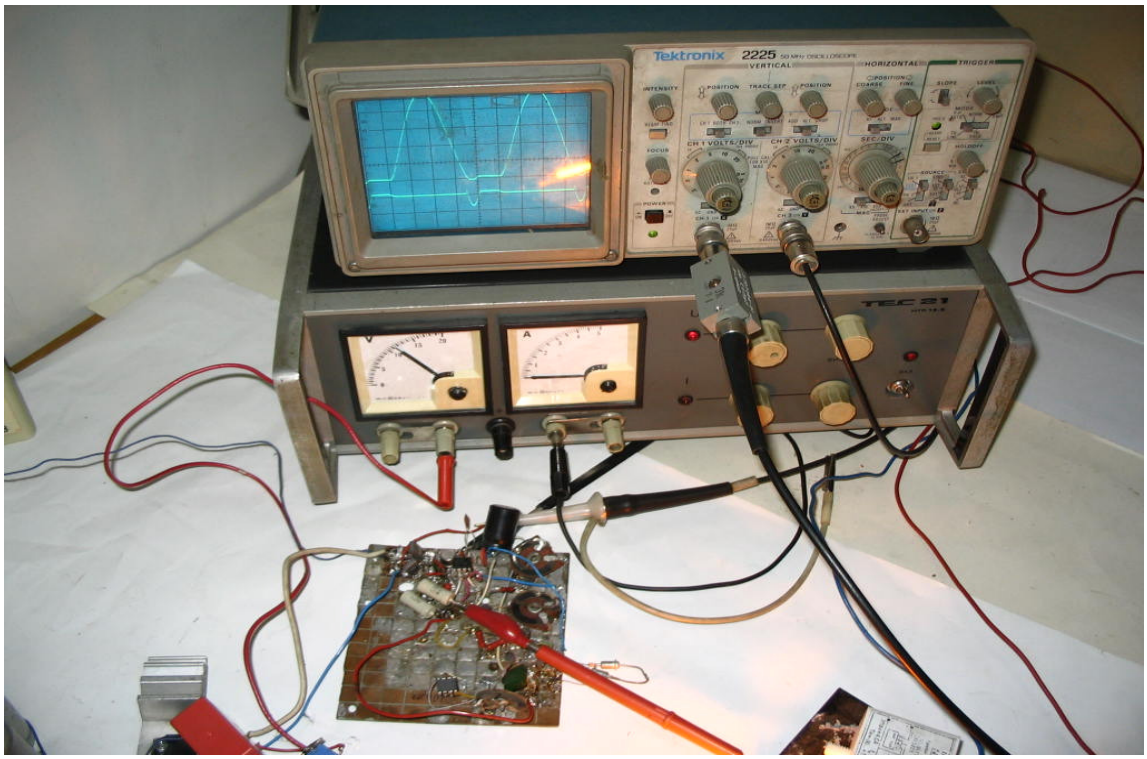

Fig. 7

A professional development can constructively design the inductor and the operative invertor class E in a compact device for assembly next to lighting lamp.

IV. CONCLUSIONS

During the carried out tests of steady processes took place at all tests with a reading of the charge by the indicators of the respective devices. The achieved results are on a very good level.