Прототипом данного изобретения может быть принят блокинг-генератор (Л.М.Гольдберг Импульсные и цифровые устройства. Связь, 1973 г., гл.6). Это генератор с индуктивностями в коллекторе и в базе, охваченный положительной обратной связью, в котором процесс изменения тока в базе прекращается при достижении насыщения в ферромагнитном сердечнике. Такой способ не позволяет получать импульсы при отсутствии в трансформаторе ферромагнитного сердечника, и хотя он и обеспечивает трансформаторную связь, но только через сердечник, кроме того, импульсы наносекундного диапазона длительности с блокинг-генератора получить нельзя. Резонансные усилители на воздушных трансформаторах обеспечивают трансформаторную связь, но только на резонансной частоте. Следовательно, в прототипах вышеуказанные недостатки не преодолеваются.

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DESCRIPTION RU2265276

NEW METHOD OF TRANSISTOR CONTROL

The invention relates to the field of electronics. The disadvantage of this method of controlling the transistor is the inability to create short-term high-amplitude pulses due to the fact that the generation and resorption of carriers formed in the base requires a certain time interval commensurate with the duration of the short pulse. Another disadvantage is the inability to transfer information from one cascade of the transistor to another without galvanic coupling between the cascades.

A blocking generator can be adopted as a prototype of the present invention (L.M. Goldberg Pulsed and digital devices. Communication, 1973, ch.6). This is a generator with inductances in the collector and in the base, covered by a positive feedback, in which the process of changing the current in the base stops when the saturation in the ferromagnetic core is reached. This method does not allow to receive pulses in the absence of a ferromagnetic core in the transformer, and although it provides a transformer connection, it is only through the core; in addition, the pulses of the nanosecond range cannot be obtained from the blocking generator. Resonant amplifiers on air transformers provide transformer coupling, but only at the resonant frequency. Therefore, in the prototypes the above disadvantages are not overcome.

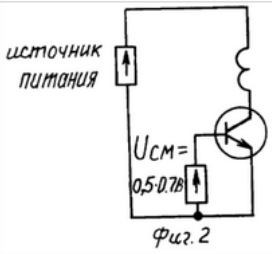
The proposed control method allows to overcome these disadvantages with the help of inductance and a number of techniques that are the subject of the present invention.

According to Lenz and Faraday, the emf of self-induction in the inductance is directed towards the current, its caller (meaning the base and collector currents arising in the locked transistor), and its amplitude can be commensurate with the voltage of the power source. If the inductance is included in the controlled (collector-emitter) circuit of the transistor cascade, a mode is created in which the Uke voltage is made smaller than Ube, and the base-collector transition becomes reverse biased, and a potential barrier occurs for the transfer of carriers from the base to the collector. Numerically, it looks like Uke = 0.1 V, Ube = 0.6 V for a silicon transistor npn. This creates conditions for the gradual accumulation of a space charge carrier in the base area for a considerable period of time. And it happens in a locked transistor.

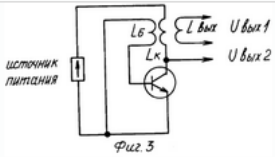
When the base overflows with carriers, it becomes a conductive channel for short-circuit current between the poles of the power source through the inductance and collector-emitter of the transistor.

The base bias source causes carrier injection from the emitter, and with the advent of carriers in the base volume adjacent to the emitter, the potential increases, having the sign of injected carriers opposite to the bias source sign, and therefore the base current will decrease with the base current passing through 0, the potentials internal and external from the source bias equal (see figure 1). With an increase in the internal potential, the potential barrier created at the base-collector junction will be overcome, and at this moment conditions are created for a short circuit from the power source through the collector-emitter and inductance.
The current through the inductance and the collector-emitter, the amplitude of which is determined by the resistance of the circuit, and its duration by the number of carriers accumulated in the base and taken from the base volume by the electric field of the power source, is the short circuit current because the resistance of the inductance and transitions of the transistor is close to zero ohms . This allows to obtain short high-amplitude current pulses at the output.
After removal of mobile carriers from the base volume of a collector current arising from a previously accumulated space charge, its resistance increases sharply (the bias voltage in the base can be constant and keeps the transistor in cut-off mode) and this is accompanied by a self-induced EMF reaction of the controlled (collector) circuit in the opposite direction.
The reverse current pulse of inductance neutralizes the sources of carrier generation in the emitter, and the larger the amplitude of the back-EMF pulse, the greater the number of sources of carrier generation covered by neutralization, the resistance of the transitions increases and is close to infinity. From this, the pause between the pulses of a short circuit of the circuit consisting of the power supply of the inductance and the transitions of the transistor becomes longer. The event occurs periodically: first accumulation of charge (number of carriers in Fig. 1b, 1st interval), then current pulse through inductance (Fig. 1b, 2nd interval), then backlash with suppression of generation sources (figd 3rd interval) and repeating the process.
In one of the variants (Fig. 2) of the execution of Kacher (the author gave this name to devices operating on the claimed control method) the cascade may consist of one collector inductance, and at the base-to-emitter transition of the silicon transistor the forward bias is set using an external source of 0.5- 0.7 volts, while the transistor is kept in cut-off mode.
In a similar case, if a different inductance is established on the contact of the base (FIG. 2), then the amplitude of the reverse reaction will become different due to mutual induction. The duration of the accumulation of space charge in the base will increase if the base and collector coils are turned on inverse, or decrease, if it agrees.
In the current understanding of the scheme (figure 3) can not work as a generator, because the base circuit is locked, because no positive offset in the base. Nevertheless, it works as a shooter - a pulse generator because the positive half-wave serves as a bias, and this circuit generates with germanium bipolar, field, transistors and p / lamp self-starting. It also works with a silicon transistor, but only with an external start, through a transformer connection, with the help of another kacher.
In the plots of FIG. 1, in the 2nd interval, there is no short circuit current trace, since the space charge is discharged due to the removal of only the carriers accumulated in the 1st interval from the base region and the transfer of the energy of the accumulated carriers to the inductance magnetic flux Lc.
Therefore, considering the EMF of the removal of carriers on Lк and Lб with respect to the current from the positive and negative poles of the power supply with the oscilloscope (fig.1, d), we see in the 2nd and 3rd intervals the same polarity of pulses on Uke and Ube. For npn

transistors, it is positive, pnp is negative in the collector of Uout2. At the base, the sign of the pulse is reverse Ube in the 3rd interval, and also its polarity is the same when viewed with respect to the positive and negative poles of the power supply.
The base current 1b is decreasing (Fig. 1a), since Ube is applied to a directly shifted pn junction. The base with the accumulation of carriers increases its own potential of the base region, and the potential created by the winding Lb is compensated with the potential growing in the base region due to the accumulation of carriers in it, and with a change of sign due to overcoming the potential barrier in the collector-base transition.
In the 3rd interval, a reverse polarity pulse is observed in the base (FIG. 1d), caused by the reverse reaction of the discharge pulse. It neutralizes the sources of generation of carriers in the emitter. The subsequent recovery of media generation causes a repetition of the process.
As established by the author experimentally, mutual induction between the base and other (collector, output, emitter) inductances can be carried out not only according to the laws of Ampere and Bio-Savart, i.e. not only through the magnetic field of the main current flowing through the inductance, but also through the magnetic moments of the atoms surrounding the inductance of the substance. In other words, the distance between the inductances in the base and collector circuits can be arbitrarily large, much larger than the sizes of the inductors. The number of turns can vary within wide limits, starting with one. Inductances can be both chip and coil arbitrary sizes. The interaction energy between the output and collector inductances decreases linearly and not inversely proportional, as it should be according to Ampere's law.
The method can be more clearly illustrated by the example of a radio tube triode with inductance in the anode.
If, due to the EMF of self-induction, the grid-cathode voltage in the anodic circuit will be greater than the anode-cathode, then electrons will accumulate in the space between the cathode and the grid, which will fill all the space between the grid and the cathode. Breaking out of the cathode-grid volume, the electrons will be carried away by the electric field of the anode. Through the inductance, the anode, the grid and the cathode will close the circuit until the electrons from the cathode-grid space are removed, and the inductance reacts abruptly with reverse polarity EMF, which will lower the level of work of the cathode output, will repeat (figure 4).
The author has developed about 20 diagrams of cutters, some of them are given in this application (FIGS. 2, 3, 5, as well as see RF patent No. 2075726 and in Brovin V.I. brochure “Phenomenon of inductance energy transfer through the magnetic moments of a substance in the surrounding space, and its application "M. MetaSintez, 2003). All of them are different, but they are united by one common principle of action.



Фиг. 2



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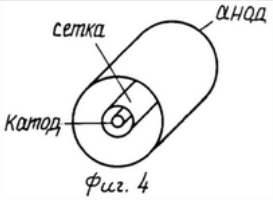

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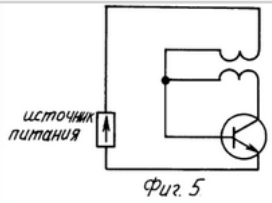
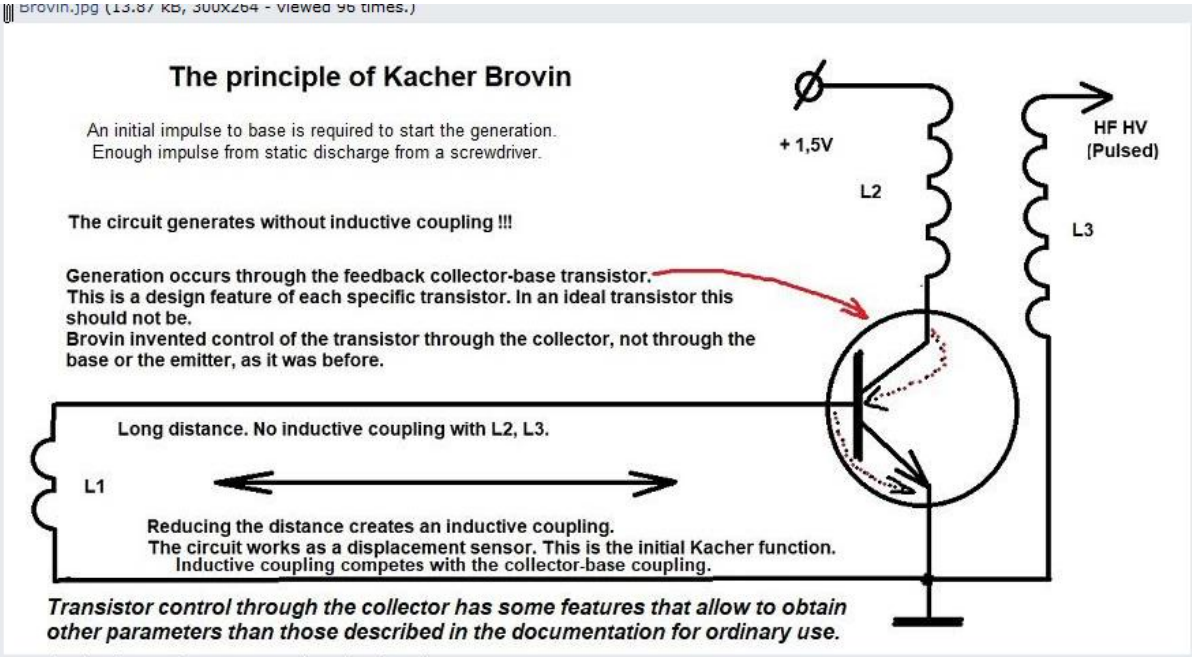


Фиг. 5

Brovin.jpg (13.87 kB, 300x264 - viewed 96 times.)



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