tion is provided the preventive character of the protection: the current is not, practically, being increased at the switching breakdown of the thyristor bridge.

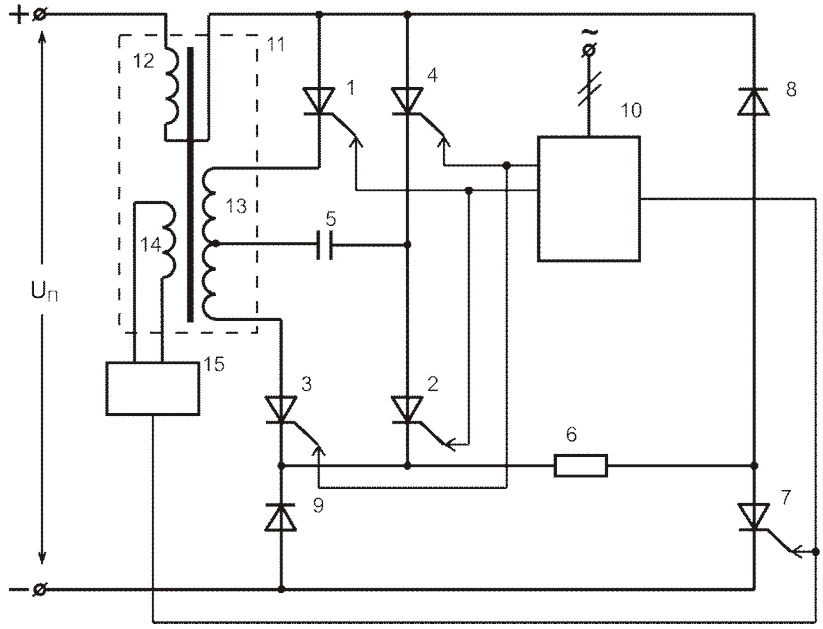

Fig.1.

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WIDENING FREQUENCY PASS-BAND OF A HALF-BRIDGE CONVERTER AND INCREASING ITS PROTECTION AGAINST THROUGH-FAULTS

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Single-phase half-bridge converters are being widely used in different secondary power sources, for example, in some inverter welding transformers [1]. Such converters contain a half-bridge in its power part; a diagonal of the bridge's direct current is connected with power source U_p via a choke [2]. The choke is a typical unit in the structure of the common converters and reduces the steepness of current build-up in transistors during through-faults, i.e. when transistors are being triggered simultaneously. But, while reducing the steepness of current build-up, the choke cuts at the same time, the frequency pass-band of the converter. That is why its inductance should be relatively small, which in its turn lowers the protection level during through-faults. All these deficiencies were eradicated in the developed appliance [3], scheme see on pic.1.

The device works as follows.

As in the common half-bridge single-phase converters, the output of control system 13 is a common pulse-width modulator that sends antipodal signals to transistors 1 and 2. Pulse duration of these impulses depends on the signals (current, voltage); frequency in modern converters that supply, for example, welding transformers, reaches 100 kHz.

Let assume, that power source U_p is on, and capacitors 8, 9 are charged each till about 0,5 U_p voltage. Then the first signal from the output of control system 13 reaches, for example, transistor 1, causing transistor 1 to trigger, and capacitor 8 discharges to load 10. Through winding 11 and winding 6 of transformer 5 flows equal current. As the windings have the same number of loops and opposite ones, they form a bifilar and do not bring reactance to load circuit. Capacitor 9 is being charged at the time. If the load is enough for capacitor 8 to discharge fully, then by the end of the converter's operation half-cycle, the capacitor 9 will receive the voltage U_p. during the triggering of transistor 2, bifilar is formed by windings 11 and 7 of transformer 5.

So, when the converter is in the operating mode, transformer 5 does not cause reactance in the load circuit, and the maximal converter frequency is limited only by parameters of transistors 1 and 2. As the magnetic flow of transformer 5 is zero during con-

verter operating, the voltage of winding 12 also equals zero.

If transistors 1 and 2 trigger simultaneously because of a defect in the control system or, for example, longer recovery of the cut-off during the transistor warm-up, or due to some other reasons, through-fault occurs, and the current flows through all three primary windings 6, 7, 11 of transformer 5 by-passing the load (completely or partially). Uncompensated magnetic flow arises, inducing voltage on winding 12 of transformer 5. Until transformer 5 is not full, the let-through current equals the magnetization current, i.e. it is negligibly small and is not dangerous for transistors.

So, protection against through-faults does not let the current grow till a dangerous level during the saturation of transformer 5. This time period could be set longer for a transformer, than the time of protection response to the switch-off signal from winding 12. Moreover, there is no need to exaggerate the recovery time for the transistors cut-off, as during the short-term «blockage» the let-through current is negligibly small, and the short output impulses on winding 12 could be blocked with the help of a duration selector, without switching off the converter. The size of the additional transformer 5 is negligibly small, its weight does not exceed 0,07 kg. The excluded from the device choke weights considerably more.

To sum up, the new appliance (fig.1) let reduce the through-fault current, widen the frequency pass-band of the converter, use it voltage properly, as well as make the converter more reliable in general and reduce its weight and size.

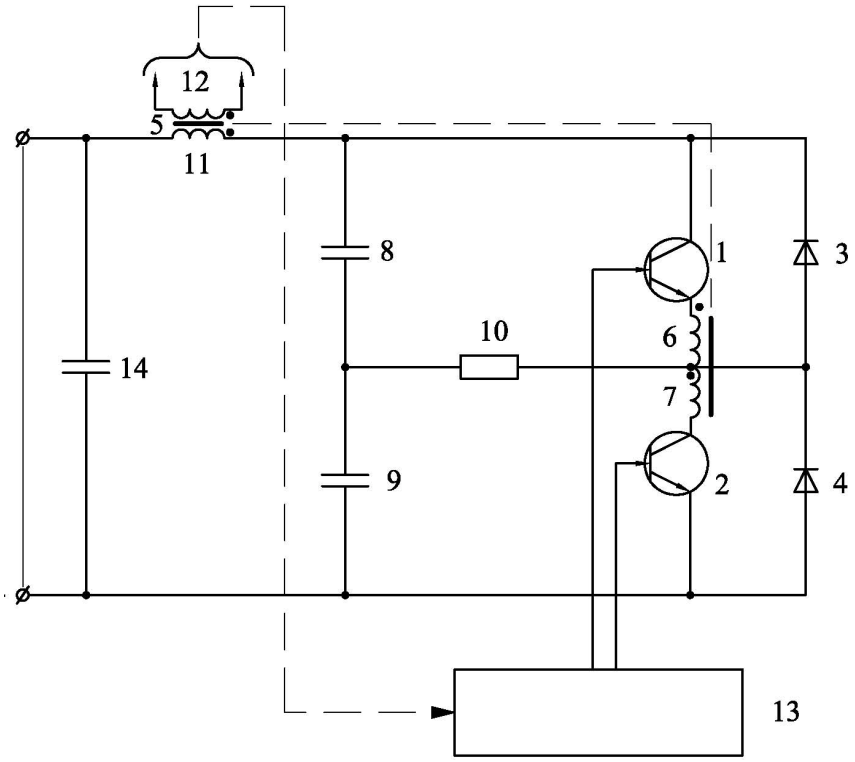

Fig. 1.

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1. «Castolin GmbH» – Germany, «Kraftzwerg», 2005.
2. V.A. Pryanishnikov. «Electronics», St. Petersburg: Korona Print, 1998.
3. Single-phase half-bridge converter. Russian Patent № 2291550 registered 10.01.2007. Authors: Magazinnik L.T., Magazinnik G.G.

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FLUID REGIME OF GRANITOIDS OF THE BELOKURIHINSKY COMPLEX (ALTAI MOUNTAINS)

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This article presents a results of study of fluid regime of granitoids of the belokurihinsky complex. The meanings of ferrous ($f = ((Fe + Mn) \div (Fe + Mn + Mg)) \times 100\%$) and aluminous ($l = (Al \div (Al + Fe + Mg + Si)) \times 100\%$) compositions, octahedral coordination of aluminium are determined by means of study of composition of