

THE DEVICE OF THE ELECTRO-JIGSAW. EXPERIMENTAL STUDY OF THE CHARACTERISTICS OF THE ELECTRO-JIGSAW

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Lobzik (from German Laubsäge) is a tool for curvilinear sawing of materials. Manual mechanical Jigsaw includes an arched frame with a handle and clamps for mounting the saw blade. The saw blade is thin and narrow, thanks to which it is possible to change the direction of sawing. The frame has a large clearance between the canvas and its top, so it can bypass the edges of the workpiece.

Manual jigsaw is usually used for processing of wood and its derivatives (in particular, plywood), and also in jeweller practice for processing nonferrous metals.

Electric Jigsaw is a hand-held power tool for sawing of various materials with reciprocating movement of saw blade (Fig. 1). The manual electric Jigsaw includes a hull with a flat platform at the bottom and a handle at the top. Inside is an electric motor and a mechanism that transforms the rotational motion of the engine shaft into the reciprocating movement of the guide. For fastening of cloths the shank with a clamping screw or a spring clamp is used.

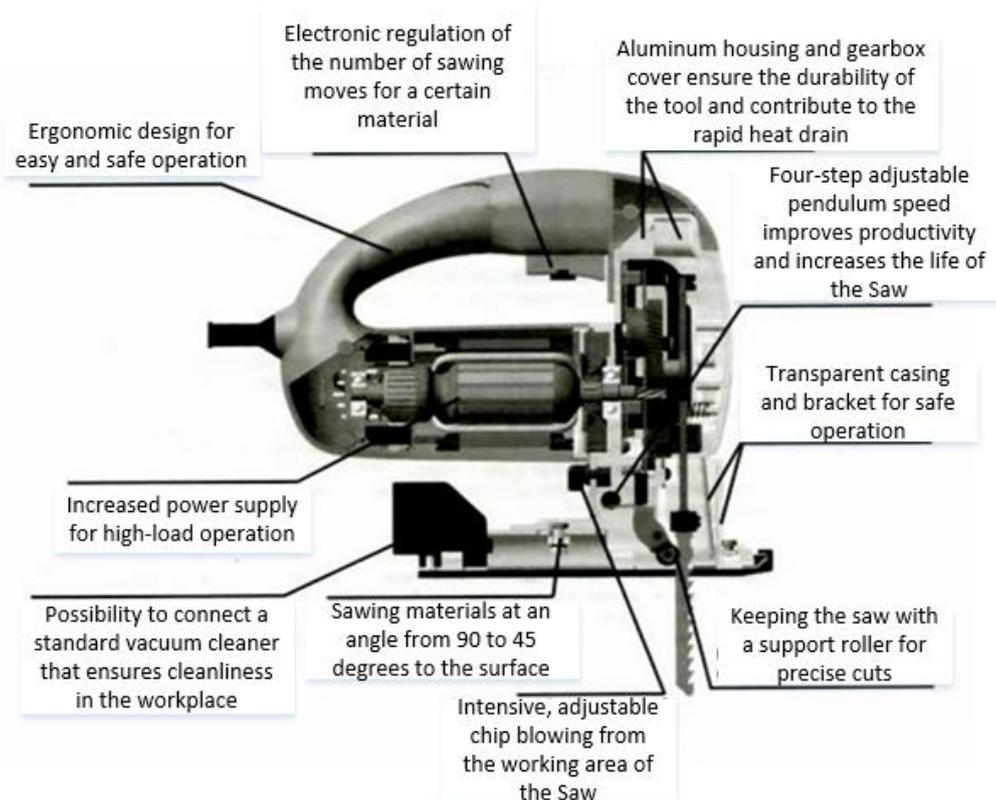


Fig. 1. Main elements of the electric-current of the AC

The first electro-Jigsaw was created in 1946 by Albert Kaufman, an engineer of Scintilla AG (Switzerland). He replaced the needle in the sewing machine on the saw blade.

The impulse-phase control system (SIFU) allows to regulate the speed of the motor shaft (and, accordingly, the velocity of the Saw), which makes it possible to process dissimilar materials. For example, when cutting metal, the frequency of rotation should be reduced to

avoid overheating of the saw (when cutting metal) or material (at cutting plexiglass, polypropylene, etc.).

The vast majority of the lobziks use forced cooling of the electric motor. The air is then drawn through the holes in the back of the case and ejected through the openings in front. Usually the outgoing stream is directed to the place of sawing, thanks to what the cut out shavings is blown off and does not prevent to lead a jigsaw on a cut line if the line has been drawn on a surface. Some models provide for the connection of a domestic vacuum cleaner to remove chips from the cutting point.

In modern elektroobziki depth of sawing on a tree reaches 150 mm, on steel 10 mm, on colour metals 25-30 mm. The teeth of Lobzikovyh cloths are directed, as a rule, upwards, to the machine that provides pressing of a workpiece to a platform of a lobzka.

In order to investigate the characteristics of the Electroshell with the engine of the PE-belt current The stand presented in Fig. 1 was made. 2.

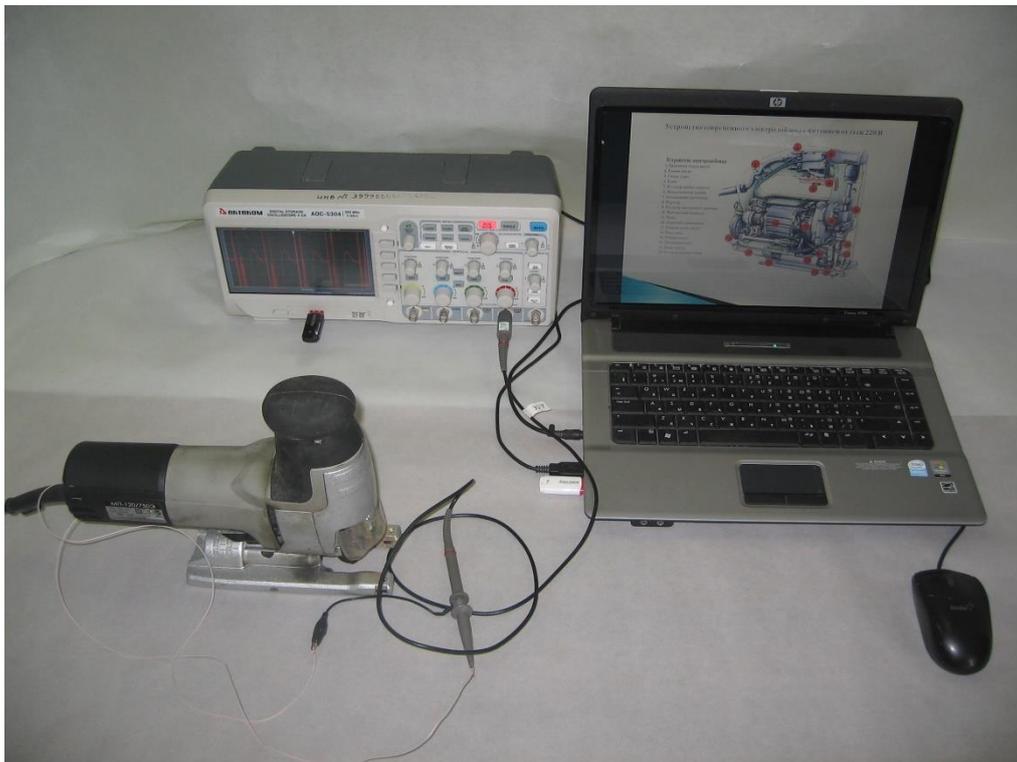


Fig. 2. The appearance of the experimental stand and the Electrolobzika

The diagram of the electric principled experimental stand is presented in Fig. 3. The experimental stand allows to carry out a complex of researches at regulation of speed of alternating current electric motor of different values of moment of resistance of MC on a shaft.

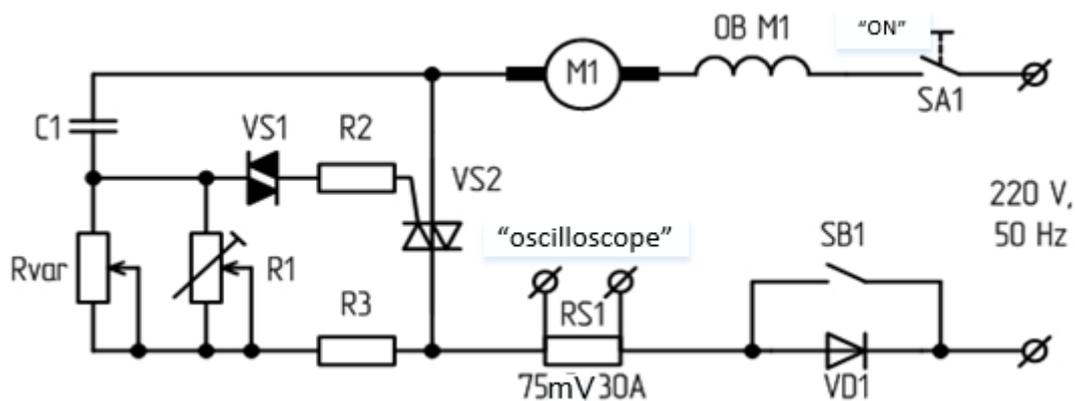


Fig. 3. Diagram of an electric principled experimental stand

In Fig. 4 are presented experimental characteristics (OSCILLOGRAMS), obtained during the study of the parameters of the Lobzka with the AC motor.

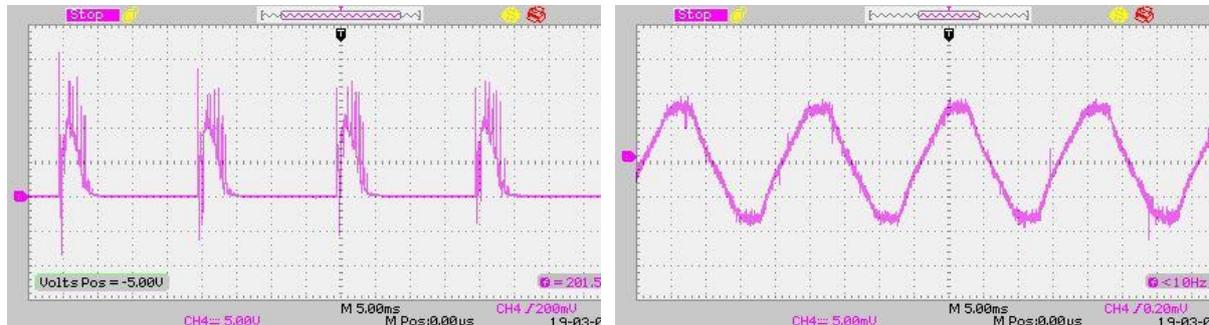


Fig. 4. Voltage and current oscillograms at the output of the speed regulator

Oscillograms have this kind because at each period of network voltage the capacitor C_1 is charged through the resistor R_{var} to the voltage of the dinistore unlocking, attached to the controlling electrode of the main key (Simistor), after which Triac Opens and skips the current to the load (to the collector engine).

Conclusions

During the scientific work on the mentioned subjects the following tasks were considered and solved:

1. The basic elements and the device of an electric jigsaw with an engine of an alternating current are studied.
2. The scheme of the electric principled experimental stand is developed.
3. A stand for the investigation of the characteristics of the Electrolobzka drive with an AC motor is manufactured and tuned.
3. The speed regulator with the principle of impulse phase control was studied.

Literature

1. Markov A.M. Electrical machines and micromachines. Ch. V. Pskov, 2015.