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ELECTRODE DRIVE UNIT OF SEAM RESISTANCE WELDING

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Keywords: electrocontact welding, welding roller drive, the current collector.
Abstract. The work is dedicated to the modernization of electrical power supply design and drive the welding rollers of the ACS-011-02 "REMDETAL" bench to improve plant reliability and quality of welded metal coating.

УЗЕЛ ПРИВОДА ЭЛЕКТРОДА ШОВНОЙ КОНТАКТНОЙ СВАРКИ

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Ключевые слова: электроконтактная приварка, привод сварочных роликов, токосъемник.
Аннотация. Работа посвящена модернизации конструкции токоподвода и привода сварочных роликов установки ОКС-011-02 «РЕМДЕТАЛЬ» для повышения надежности установки и качества привариваемого металлопокрытия.

The economic feasibility of restoring parts due, above all, the possibility of repeated and repeated use of worn parts. Unfortunately, in modern conditions, the proportion of restored parts is insignificant, although the creation of industries for their restoration requires less capital investment compared to enterprises for the manufacture of spare parts.

Recently, resource-saving technologies, which are being implemented without a substantial increase in material costs, have acquired particular importance. This fully applies to the recovery technologies of worn-out automotive parts. As before, one of the most promising, effective recovery technologies is electrocontact welding (ECW).

Electrocontact welding (ECW) of steel tape and wire is the most promising method of recovery. This method has a high process efficiency (60 cm2 / min), no heating and deformation of the part, a small depth of the heat-affected zone, quenching the coating directly during the welding process, minimal losses of the filler material, the ability to restore parts with little wear by adjusting the thickness of the weld Coating and environmental friendliness of the welding process [2].

The negative point of the RPC is the presence of oxidation zones, low roller durability, the formation of residual stresses.

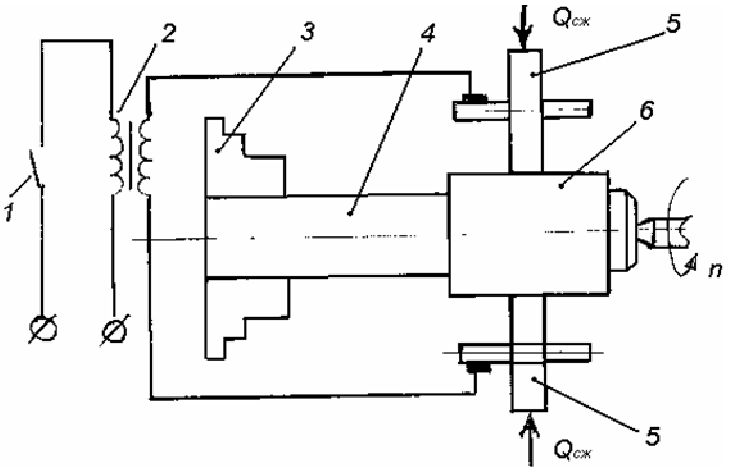
Electrocontact welding of powder materials is also a progressive way to restore parts. The disadvantages include increased consumption of filler material, relatively high cost of industrial powders, low process stability [1].

The issues of regulating the thickness of coatings, ensuring high adhesion strength of difficult-to-weld filler materials and restoring the ECW of parts with large wear and tear (up to 1.5 mm) are not fully resolved. Remains poorly studied issues of quality indicators of coverage. Therefore, the solution of these issues is relevant and is of national economic importance.

Electrocontact welding of the metal layer occurs as a result of the impact of welding pulses, forming welding points. In this case, welding is carried out with

powerful current pulses passing from the axis of the disk electrode 5 (Figure 1) through the disk electrode to the part 6. The current strength is about 4 ... 30 kA with a pulse duration of 0.02 ... 0.16 s.

For the installation of parts, the “Remdetal” settings are used: 011-1-02 and OKC-12296-GOSNITI - for shaft necks; 011-1-05 - for threaded parts of the shaft of small diameters and top parts of the type "shaft"; 011-1-06 - for internal surfaces of cylinder liners; 011-1-11 - Cylinder block main bearings. The most widespread installation is OKS-011-02.



1 - breaker; 2 - transformer; 3 - chuck for mounting details; 4 - recoverable part; 5 - roller electrodes; 6 - welded tape

Fig. 1. Scheme of electrocontact welding of a tape on a shaft

It uses a welding head GKN-P1, a power source - a transformer with a power of 75 kW, a welding interrupter and a base rotator - a 1K62 lathe or another model. Parts with a diameter of 20 to 200 mm, a length of up to 1200 mm, a thickness of the welded layer of 0.3 ... 1.5 mm, a rotational speed range of spinning from 0.15 to 15 min-1, the speed of movement of the welding head 4 are restored on this machine. , 5 ... 450 mm / min, productivity 100 cm2 / min [5].

Rollers (electrodes) are made of special copper alloys, bronze (BrNBT, HKd-0.5-0.3, BrH, BrHTsr-0.6-0.05), Mc-4 alloy, copper M-1, mounted on steel steel shaft 45.

In the existing drive units, the roller electrodes 2 (Figure 2) are fixed to a bronze disk 3, in which a bronze sleeve 4 is pressed into the hole. This sleeve acts as a bearing, but in the process of operation, due to heating, the lubricant is quickly lost, into the gap with axis 5 gets coolant, additive powder, etc. All this significantly worsens the friction conditions. Due to the ingress of powder particles onto parts with a roller electrode, there is a strong deterioration of the mating of the shaft-hub, a strong backlash of the roller electrode 2 appears, which greatly impairs the quality of the restored surfaces of the parts. To eliminate these defects, we propose to upgrade the OXS-011-02 installation of Remdetal available in the unit using a new roller electrode drive design (Figure 3). The proposed design of the roller electrode

drive is characterized in that the under-hub unit is changed and a special current collector is inserted. When this bearing 8 is used closed and eliminates premature wear of the node. With the passage of current from the castor 4 to the glass 2 through the conductor 3 decreases electroerosion wear parts, as they are preloaded by the springs 5, adjustable nuts 7. The most important and crucial part of an electrophotographic installation is a roller electrode, which must be made of heat-resistant materials with high electrical and thermal conductivity. In the installation we used, the roller electrode is a disk with a diameter of 300 mm and a thickness of 10 mm made from the BrNBT electrode alloy, which has a high electrical conductivity and a fairly high wear resistance.

The use of roller electrodes with a working surface hardened with heat-resistant materials is promising. Electrodes for contact and roller welding, for example, are known, which contain a base of high-electrical and thermally conductive material and a work surface hardened by a layer of high-strength, heat-resistant material (tungsten, molybden, etc.). The advantage of such electrodes is a high wear resistance, but due to the low electrical and thermal conductivity of the working surface, such electrodes do not find practical application.

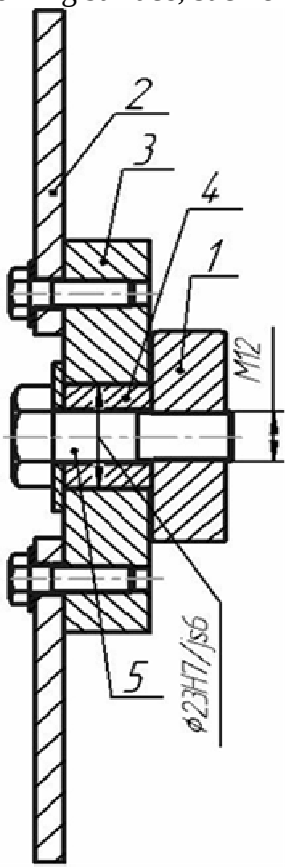
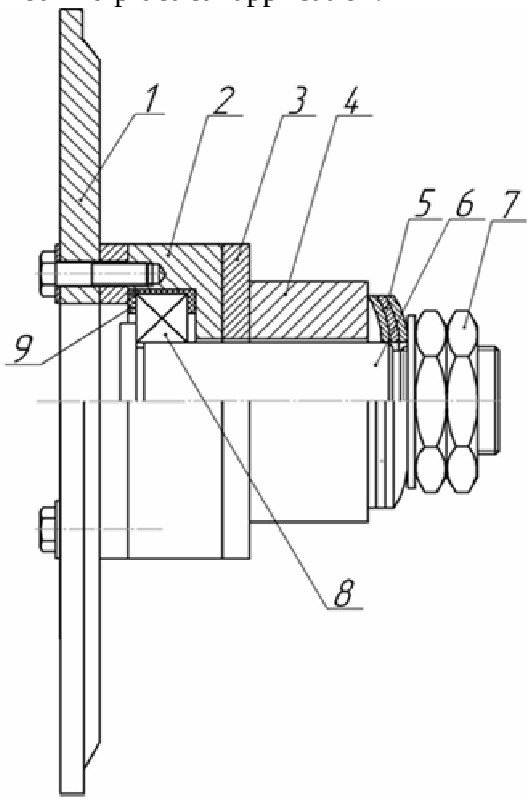


Fig. 2. The existing design of the drive roller electrode



1 - roller electrode, 2 - copper cup, 3 - conductor, 4 - castor bean, 5 - cup springs, 6 - axis, 7 - nuts, 8 - sub-horn, 9 - insulating textolite bushings

Fig. 3. The proposed design of the roller electrode drive

The most important and crucial part of an electrical contact installation is a roller electrode, which should be made of heat-resistant materials with high electrical and thermal conductivity. In the installation we used, the roller electrode is a disk with a diameter of 300 mm and a thickness of 10 mm made from the BrNBT electrode alloy, which has a high electrical conductivity and a fairly high wear resistance.

The use of roller electrodes with a working surface hardened with heat-resistant materials is promising [4]. Electrodes for contact and roller welding, for example, are known, which contain a base of a high-electrical and thermally conductive material and a work surface reinforced with a layer of high-strength, heat-resistant material (tungsten, molybdenum, etc.) [3]. The advantage of such electrodes is a high resistance to wear, but due to the low electrical and thermal conductivity of the working surface, such electrodes do not find practical application.

Modernization of the OXD-011-02 unit manufactured by «Remdetal» for electrocontact welding with the use of a new design of the rotor electrode drive allows increasing the service life of this unit, reducing the cost of servicing and repairing the unit and improving the quality of the parts being restored.

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