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Restoration Erosion Working Surface Of Gin Rib By Welding Process

Xoshimov Xalimjon Xamidjanovich
PhD Student, Department Of Technological Machines And Equipment, Andijan Machine-Building Institute, Andijan, Uzbekistan

Igamberdiyev Madaminjon Qo`Chqarboyevich
Assistant, Department Of Technological Machines And Equipment, Andijan Machine-Building Institute, Andijan, Uzbekistan

Abdullayev Shavkat Azimovich
Assistant, Department Of Technological Machines And Equipment, Andijan Machine-Building Institute, Andijan, Uzbekistan

Xoliqov Farrux Baxtiyor O`G`Li
Magistr, Department Of Technological Machines And Equipment, Andijan Machine-Building Institute, Andijan, Uzbekistan

ABSTRACT

This article describes the technology for restoring worn working surfaces of a grate of a saw gin by surfacing them. Inlet wear of the working surfaces of the grate of the gin causes poor fiber quality. Worn parts lead machines to work with a deviation from the set parameters, reduces the efficiency of machines, leads to the emergence of additional load-bearing machines, which leads to a deterioration in the operating condition and the weakening of machinery mechanisms. To prevent these drawbacks of worn parts instead of replacement with new ones, surfacing under the flux is used, which is economically profitable. Studies were conducted to study the macro- and microstructure and heat treatment of the deposited working bodies using a metallographic microscope, determine the composition based on spectral analysis, determine the hardness using the Brinell and Rockwell methods, determine the sample wear rate in an abrasive medium developed on a special machine. On the basis of the executed researches recommendations about introduction of alloying elements in building-up welding metal are given.

KEYWORDS

Surfacing, restoration, welding, wear, friction, welding wires, welding electrodes, rib gin, seed cotton, welding mode, microstructure, chemical composition, hardness, saw discs, spectral analysis and temperature.

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INTRODUCTION

All fields of national economy progressed perceptible in the previous independent years of Uzbekistan. Including treatment to metal in machine-building, foundry work and reconstruction of erosion metal. Many parts of reconstructed metals are working metals of machine, Which are used at the cotton cleaning factory, For example; gin ribs of cotton gin.

Inside working camera of gin machine,there are the gin ribs,which are fixed by making fence next to other one.Through each gin rib's fence,disc saws were installed,While rotatation they take fibre with their teeth from cotton seed and conduct through it .Cotton seed does not cross through the fence,Because it is bigger than fence's space,but there may become some problems such as,uneven rotation of saws,touching to gin ribs.The saw discs and gin ribs are gotten erosion as the result of touching fiber,After erosion distance through gin ribs become bigger then cotton seed can cross with fibre and it effects its quality.By doing Research at the fiber preparing factory we knew that the work period of cotton gin rib's are 3-4 months.Working surface of gin ribs have shown erosion bigger than 1,0 mm.In that case,The gin ribs are unnecessary,If erosion of gin ribs' surfase more than 1,0 mm and they become wast material.The erosion of gin ribs is only 2 % of full part.By doing analysis we may know that,Alternation of wasted gin ribs with new ones is pointless from ecomical side.

MAIN PART

Some scientists did researches in order to make longer gin ribs of cotton gin's working period in our country and around the world, for example; In the industry of USA research was done in order to cover erosion surface of gin ribs with tungsten carbide on initial working cotton, but tungsten carbide is much more expensive and welding sheeting is difficult process.

In our country, in order to make longer working period of gin ribs and its erosion, R.H.Mustafin did research on it and He achieved good result by doing experiment and making recommendation fixing solid alloy plaster, however it was not recommended wide to producing.

A.A.Safayev and I.Y. Rajabov recommended nitrogen cemented, changeable, plaster ribs of gin machine's and linter in order to make longer its work period on their scientific articles. This can give an opportunity to working surface of gin ribs to work in the norm way and long time, but this kind of platinium is also very expensive.

Sh.Sh. Shonasirov suggested method for erosion working parts of gin ribs to cover with plasma coating, but the method was not established because of a lack of necessary materials and technological equipment for the production of introduction. In another experiment, the working surface of gin ribs was done an experiment by use of an electric spark in order to increase the reliability, also to cover with electrical metal method was done for increase durability of the gin rib's working surface.

However, on the done researches to make reconstruction of the physical and mechanical

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properties of the surface layer, such as composition, structure, hardness and impact indicators were not studied and taken into account. By taking into account those, which were mantioned above, in order to increase of erosion gin rib's work surface to cover welding with durable coating, doing researches were planned. On the experiment composition of covered surface with welding coating for physical and mechanical properties of the surface layer composition, structure, hardness and durability effects and to study for erosion were planned.

Testing of welded columns in the laboratory ГОСТ 30480-97 "Обеспечение износостойкости изделий. Методы испытаний на износостойкость" method.

Existing and working surface eroded columns are removed for testing and the surfaces are cleaned of various contaminants (dirt, oil and rust). Samples were prepared on the cleaned working surfaces using electrodes Т590, Z408, Св-08Г2С and УОНИ-13/45 in the form of arc coating on the handle. The dimensions of the prepared samples were determined.

Fig 1. The process of restoring the column and its welded surface

The samples were then tested by mounting them on a special crushing machine developed by the researchers. The task of the device is to create a device that is simple in design and reliable in operation for grinding the end working surface of the grate.

To achieve this task in a known device containing a working table, a grinding body installed above the table with the possibility of interacting with a drive through a belt drive, it is equipped with a frame made in the form of a two-armed lever fixed on the pylons, mounted

with the ability to move in a vertical plane, on which with On one side, a shaft with a grinding body is installed with the ability to rotate, and on the other, a drive, and the grinding body is made in the form of a set of grinding discs, while a through opening is made in the table, at the opposite ends of which in the direction perpendicular to the plane of rotation of the lever are located bars

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with grooves to secure the grate to be processed.

The essence of the device is illustrated by drawings, where figure 1 shows a general view of the installation for grinding the grate of the saw gin, side view; figure 2 is the same, plan view (the safety casing is conventionally not shown); in fig. 3 - view A in FIG. one; in fig. 4 - section b-b in Fig. 3; in fig. 5 - section b-b in fig. 3.

The device for grinding the grate of the saw gin contains a table 1 with a tabletop 2, on which a frame 4 is fixed on the pylons 3, with the possibility of turning in a vertical plane, while on one shoulder of the frame there is a drive 5 with a drive pulley 6, and a grinding body is fixed on the second shoulder, including a working shaft 8 mounted on bearing supports 7 with grinding discs 9. The latter are mounted on the shaft by means of cylindrical bushings 10 and a cap nut 11. At the output end of the shaft, a driven pulley 12 with a V-belt transmission is mounted 13. The frame is rotated by a handle 14, and the grinding discs are covered with safety covers 15. Under the grinding body on the countertop there is a through opening 16, on both opposite sides of which, perpendicular to the direction of rotation of the frame, there are grate bars 17, fixed to the countertop by means of a bolt connection 18 through longitudinal grooves 19. To the bars through feet 20 with screws 21 grate are fixed 22, forming a grate. Under the countertop there is a container 23 with water for trapping abrasive particles.

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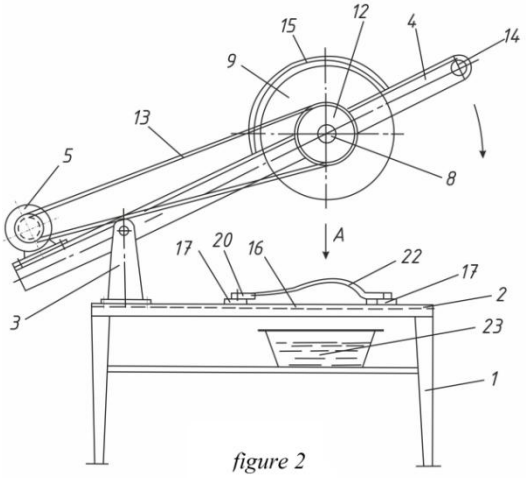

figure 2

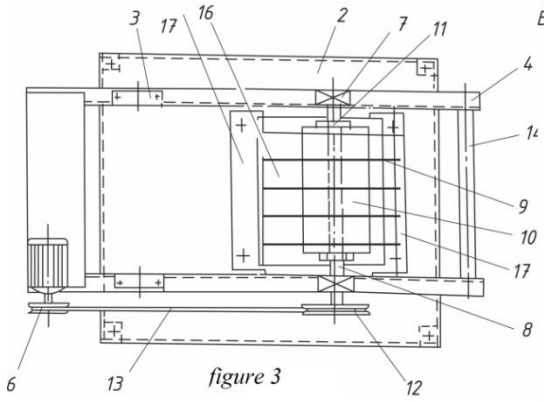

figure 3

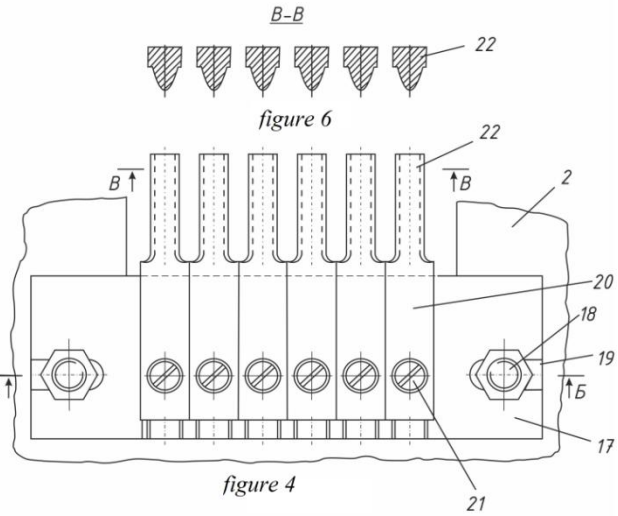

figure 6

figure 4

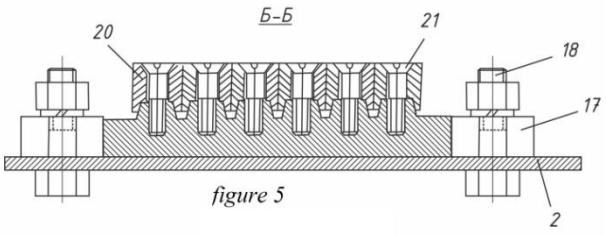

figure 5

The device for grinding the grate of the saw gin works as follows. The grates 22 are placed with their paws 20 on the grate bars 17 and secured with screws 21. The grate legs are stamped with a trapezoidal cross section and fit well on the grate bars 17, which are also made respectively with trapezoidal protrusions, which ensures the strict orientation of all grates and their tight fit to each other. to friend. After installing all the grates, moving the grate bars along the longitudinal grooves 19 to the left or right, fix them by tensioning the bolted joints 18, while the grinding discs 9 pass into the gaps of the grate and apply the grinding surface to the side face of the grate. After approximate such "fitting" include the drive 5 of the grinding body and begin the process of grinding one face. After completing the processing of one facet, the bolted connection 18 is loosened and the grate bars 17 together with the grate bars 22 are moved to the opposite side and the other facet is machined. The other batch of grates is treated in the same way.

RESULTS AND DISCUSSIONS

Each sample was tested for eating for 30 minutes in the same mode. In this case, the force acting on the saw blades on the saw disc is 5, 10 and 15 N; the speed of the saw blade was set at 730 rpm. After some time, the sample was removed from the device and their linear wear was measured using a micrometer. In order to ensure the accuracy

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of the results, each experiment was repeated 3 times, the average values of the results are given in Table 1.

Table 1
Average wear values of the tested samples

№	Welded coated material	The amount of wear of the welded layer (mm)			Average eating amounts (mm)
		1	2	3	
	T-590	0.01	0.02	0.025	0.018
	Z408	0.016	0.032	0.04	0.022
	Св-08Г2С	0.02	0.04	0.05	0.036
	УОНИ-13/45	0.026	0.053	0.06	0.046
	Rib gin	0.04	0.08	0.1	0.073

As can be seen from the table, the average wear of existing columns is 0.073 mm, electrode welded to the working surface with electrode brand T 590 0.018 mm, electrode welded electrode brand Z408 0.022 mm, electrode welded electrode brand Св-08Г2С 0.036 mm and УОНИ-13/45 The column welded with electrodes of 45 marks was 0.046 mm. This can be seen from the graph constructed based on the results in Table 1.

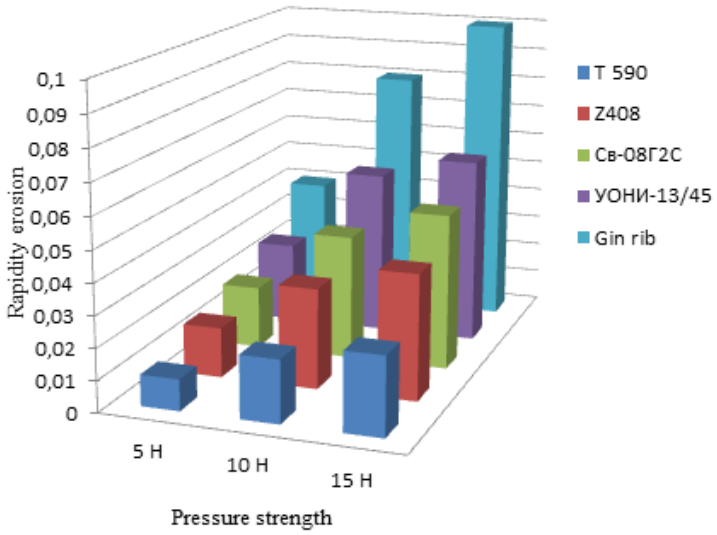

Fig 6. The average wear intensity of the samples.

The aim from metal restoration is to erect them to standart measurement and to restore work capability. The eroded surface should be restored in this way that, the restored metal surface's durability should be at least same with former one.The result of touching saw

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disks to the gin rib's surface,The ribs working surface may be eroded, as well as to produce sparks. This leads to the burning of fiber. In order to solve the problem ribs are prepared from special (СЧ -15-32) cast iron,the saws are made ready from carbon steel. This avoids fiber from some extent a spark burning.Therefore similar material to the СЧ 15-32(carbon steel) is chosen for gin rib's surface in order to restore with welding material. Experiments has shown that chemical substance of covered welding surface with T590 electrodes is more similar to the chemical composion of working gin ribs' than other chemical composition of covered electrodes.When we did an experiment micro structure of samples,that showed that,covered welding sample with T590 elecrtode was more smooth and better than others.Because,chemical substance of covered metal consists of more chromium.If chromium is entered to welding bath,main metal is dissolved more little Because, Chromium has high tolerance for liquid temperature.It surpasses electricity expenditure.Also we can see from the 1-table that durability of covered welding samples with T590 elecrodes are higher than others.We might make conclusion that, becoming higher of durability provides gin ribs' surface to be hard and eroded slower.

CONCLUSIONS

1. Thus, we can see that the electrode welded with electrode brand T 590 erodes 4 times less than the existing eraser, electrode Z408 erodes 3 times, electrode Св-08Г2С erodes 2 times and electrodes УОНИ-13/45 eats 1.5 times less.
2. According to the results of the test, the corrosion resistance of the sample welded to the working surface with an electrode brand T 590 was found to be higher than others, and it was recommended to use it in the restoration of the crushed columns.

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