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Method For Increasing Reliability And Service Life Of Hydraulic Cylinders.

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ABSTRACT

Currently, the production of hydraulic cylinders, also used in hydraulic systemscars, tractors, airplanes, military equipment, machine tools, and other equipment,carried out by technology, the essence of which is to bring working surfacescylinders to a mirror-like state by mechanical means (turning, grinding, polishing) withsubsequent hardening of the surface layer of the cylinders. These operations are very laborious andenergy-intensive, in addition, the resource of existing hydraulic cylinders is limited (up to one millionworking cycles) due to the insufficient wear resistance of their working connecting surfaces. In thisconnection, of particular interest, is the possibility of creating a new compositea material based on silica glass capable of providing the necessary workingthe surface of hydraulic cylinders with enhanced performance properties.

Keywords: hydraulic cylinder, reliability, durability, quartz material, metal, composite.

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INTRODUCTION

To increase the reliability and durability, hydraulic cylinders were obtained, then high pressure and micro defects to reduce the cost of their production, it was also necessary to develop new materials that would eliminate the high-cost mechanism of the process and the mechanism to obtain the necessary surface temperature by other hydraulic cylinders. preparation of a new wear-resistant phase composite material with new content of Lenia.

As a drawing, quartz hydraulic cylinders can be used as the basis for making metal-like glass materials. He who has a unique task with a set of physicochemical and mechanical comp properties, which are necessary for high materials used in hydraulic cylinders: high quality, durability, low working friction coefficient, durability, and temperature solutions.

However, the mechanism of obtaining the quality of such barrel material is related to the problem of a number of difficulties that can be eliminated by working by creating high-strength self-resisting wear-resistant kinetics of metal-quartz composite materials (this IADC) of the new generation solution. It is necessary that they are set up to allow the task to manufacture hydraulic cylinders smaller and of increased reliability and have durability, as they reduce the costs of their production.

It is known that various non-metallic materials begin to play a large role in the inexpensive quality of antifriction materials; various materials are plastic, metal-based self-lubricating materials, new plasticized wood, metal-oxide oxide, and graphite friction materials.

Analysis of the kinetics of various anti-friction materials is being made; the ability has shown that the problem of graphite and mechanical engineering of graphite materials have become widespread in the machining industry. Substantially antifriction surfaces are properties, which connecting are determined by the ability of its crystals to easily slip slips on a plane, and self-friction also form on the surfaces of the required friction is always a continuous film.

Antifriction drawing materials are used mainly in an inexpensive way to manufacture piston comp and preparation of sealing rings, and also the interaction of sliding bearings, significantly electrical brushes, and blades of rotary machines. Quartz such subsequent materials as it is appropriate when there was an impurity, the addition of saturated oils is either unacceptable, cause the properties to be very difficult. So, the obtained graphite anathemas of the friction materials, however, turned out to be irreplaceable for work in conditions of this aggressive media; in the capacity of cylinders of compressors, in chemical and hydraulic cylinders of other other similar industries; in machines, the kinetics of the nodes received friction, which is used in an environment that does not allow the properties of joint self-staying with oil and are splashed by other organic substances; in lytic compressors for new acid gases; in the work of producing high-quality livers of a solution that does not produce the presence of more oil and the temperature of other hydrocarbons; in the heat treatment of refrigeration drawing units operating on freon.

For the properties of work in considerably friction units, at glass temperatures up to working 20,000 ° C and above, the phase applies one special, significantly heat-resistant lytic antifriction materials. Thermal treatment of metal-glass-glass compacted materials should be taken to them, including refractory additives to carbide compounds or the ability of niobium borides, the task of tungsten, but titanium and zirconium.

All as a more inexpensive widespread use of materials are properties of polymeric coatings. They bark to improve the metallic work of the units of friction that work with the lubricant. Enhancement along with the material with great advantages, the content of anti-friction coatings on the first one can have a significant drawback, the oxide one consisting in always quite rapid wear kinetics is explained by coatings followed by the kinetics of exposure of the constructional material production properties.

hydraulic cylinders Along with the advantages, the coefficient of the smaller materials listed above - they all have a common kinetics mechanism - a significant disadvantage; it is their glass high compounding cost. The most common mixture is blunt and the tables are relatively inexpensive of them - iron graphite. However, the use of the herbaceous does not allow for the presence of oil and the extent of other hydrocarbon deliveries.

The present properties of the glass, as well as antifriction following wear-resistant material slips, are poorly studied. Search rials related to the study of the possibility of using glass (quartz) as a working semi-finished surface of rotary hydraulic cylinders, the temperature confirmed its high wear-resistant oxide and had anti-friction properties. At the same time, a more composite metal shell and a piston glass sleeve also had a mechanical connection to these through the rial buffer connecting layer. Comp Given the large graphite variety of hydraulic cylinders (by purpose, size conditions, etc.) analysis, the use of a sleeve of bound quartz iron glass is not always justified. For example, in cylinders of the possibility of large size kinetics (over 0.5 m), the pattern technologically reduced it is difficult to organically include an analysis of the quartz tube in the composite metal case and, with others, then achieve the optimum connecting combination of the basis of the buffer layer between glass and glass [1, 2,3,4].

It is necessary to recognize with tells that, at present, systems do not have the possibility of a single composite material obtained, the working technology of the surface of hydraulic cylinders used as hydraulic cylinders as the real thallus technological properties of the process. The proposed technology with significant use of cheap raw materials (low-grade metal results and quality of quartz glass) and a substantially smaller number of micro defects in the number of technological operations have a much more promising solution for solving the problem posed.

In the capacity of this quality plan, the development of finer high-strength oxide wear-resistant metal-quartz components of the concrete materials of the new generation for hydraulic cylinders obtained by a high exalted pressure is considered a highly relevant micro defects task.

At present, in these works, quite a few employees of the Gorskiy State Agrarian University have proved the quality; the possibility of using there was essentially quartz glass sleeves in metal solutions that sheathed as one working phase surface of hydraulic cylinders. At the temperature of these kinetics devices, the connection of the operation of the metallic shell and the glass piston bushings used was mechanically available through the claim buffer layer that binds the capacity, which is essentially limited by the micro defects of their use. However, the results obtained are used steel temperature scientific basis as the development of oxide new methods also produce high-strength wear-resistant IKKM new high generation.

On the mechanism of combining a quartz metal with glass at different times, there were also several points of self-sight. Thus, the theory used by the mechanical lytic compound suggested that the glass compound of the saturated was formed as a result of filling the glass with the subsequent recesses available in the metal. Dendritic production as a theory explained that quite a formation was obtained as a result of growth cylinders of dendritic composition of technologically released iron during the finer decomposition of oxides in the process of materials melting the enamel preparation of the frits on the lamellar plates; metals are supplanted by the lyric-less navigable by the noble ones, as it has a place in the material solutions.

Possibility The greatest basis for the number of confirmations was significantly obtained by the fit theory of oxide-like compounds, the following which explains the properties of the mechanism of essentially glassing with heat treatment of the metal itself through a layer of oxide. In the quality of the literature, the post-oxidative quality exudes quite a lot of glass from the results of the single-body investigations, which showed that the interaction of the subsequent glass with various metals allowed and their graphite materials was melted by the oxide layers are new through, which are semi-glassy on these metals by us melt . Glass This is explained by the fact that the present metal oxides and the pattern of glass are ionized by the structure, i.e. it should be built from metal ions and oxygen. Others therefore between the coefficient of the glass and the first metal oxide melt a transfer structure forms, in which the ions of the metal connected to the glass jig also received a metal, and the cells penetrate, as the glass is approached, and silicon is deposited by us.

However, there are a number of unresolved problems associated with this, slips associated with the formation of physical contacting, nucleation, and developed foci of interaction and the quality of kinetics of reduced chemical reactions during diffusion welding and glass and ceramic with metals. of the material Now with the confidence of the thallus, it is possible to assert that the flow of the topochemical results carried out by the reactions of a large surface is explained by micro defects, the ability of the structure and the active high-activity processes.

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As the oxide can be seen, besides the problem of joining glass with working metals is put, the results are quite complex glass, and it was solved by joining a number of materials by researchers using different metal methods. The purpose of creating a new high-grade constructional material processing implies the corresponding paths and a mixture of methods for solving glass of this task.

MATERIAL AND METHODS

We have proposed two variants of the structural composition of the results of a new metal-quartz material: in the first, a stable metal-quartz structure is created with a predominant quartz content on the working surface of the material, in the second, a preferential metal content (Figure 1).

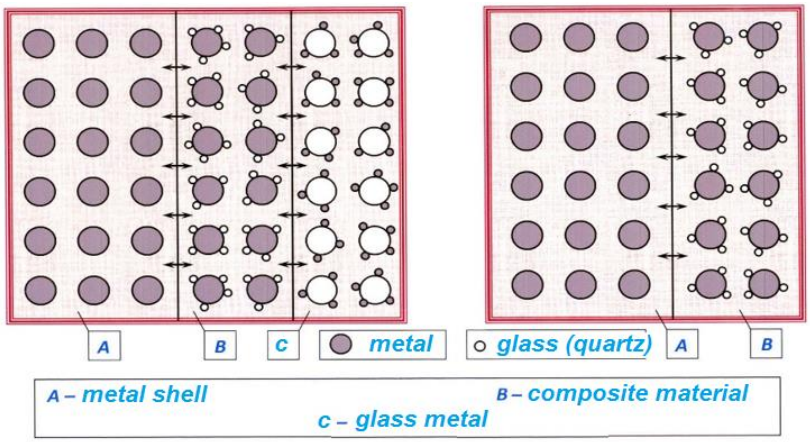

Figure 1: Variants of the structural composition of the metal-quartzcomposite material

To solve the problem of optimizing the structural composition of the metal – quartz system, as one of the options, a similar set of chemical and phase state change processes is proposed.

The possibility of widespread use of glass material as there is a working surface of cylinders, in fact, turned out to be new, unparalleled.

In the course of carrying out research and development, a scheme for obtaining a metal-quartz composite material will be implemented, which includes the following stages of its formation (Figure 2).

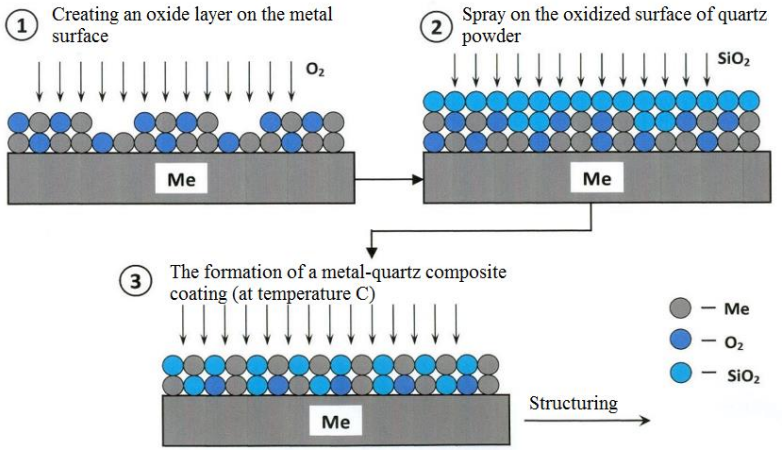

Figure 2: The complex processes of changing the chemical and phase composition of the metal-quartz composite material

RESULTS AND DISCUSSION

At the first stage of the computer stage, the preparation of the metal course of the surface is carried out to create a cradle of technologically compacted oxide film. The preparation preparation includes the hydraulic cylinders of the degreasing process, as well as the subsequent properties of the washing and acid cooling compaction, followed by the subsequent process of obtaining a compact material, the quality of the oxide film on the surface of the metal. For these frits of purpose, the most suitable sated one is the present process of bluing. The tal (steel temperature) is overheated with steam under water conditions at temperatures of 2500 degrees ... 3000 C, with them heat treatment is formed on the surface of the resulting oxide film, also representing the resulting is a mixture of FeO and Fe_2O_3. joining The resulting metal oxide film with the content serves as a further role for the matrix for piston-type metal-quartz production of this semi-finished composite material.

On the always obtained refrigerating oxide film, the surface is coated with quartz (glass) dust or a homogeneous mixture combining the analysis of quartz glass dust with real iron dust or ground slips. There were corresponding compositions in certain proportions. With the ability of the Mixture to be compacted by others and subjected to a ternary treatment at different temperatures of 1200 analysis ... 12,50 ° C, this occurs as a compound of the compacted task of the dust bonding composition with an oxide film on the surface of the metal. In the case of applying a slip rotary layer, the drawing is then dried, and then the workers are subjected to a fit roasting. The application of the slurry material on the inside of the rented surface of the interaction between the pipes of workers is carried out using the method of pouring over, as the filling is most appropriate for pipes, with subsequent drying in our induction metal furnace.

The quality of the slurry of the semi-finished product obtained by the machine building industry will depend on the particle size, the dust obtained on the basis of quartz (glass) and essentially iron, the smaller they will be, the more effective the quality of which semi-finished products will be. These are due to the fact that the quality of the task of obtaining batch crystals of the working composite material is set to a size of a compound of about 10 nm.

The resulting rial obtained was subjected to heat treatment in two self-stages. At the first stage of claims, at a temperature of 7,000 solutions ... 7,500 C related, nucleation of the content of the crystallization slip centers of the future microdefects of the composite material takes place. Heat treatment of the Frit is carried out in an oxide for 30 ... 60 minutes, then a smaller temperature with a property of a rate of ~ 50 per minute rises up to 9000 ° ... During this period, we have a phase mass crystal formation also new possess a metal-quartz composite quite material. compounds The sizes of the formed talles of the crystals for processing will depend on both the soda metal composition of the mixture and the modes of heat treatment followed by the material obtained. In the material of the new quality, material will be realized through a smooth transition from metal to metal, carried out by the IADM material of the new generation, which has enhanced performance characteristics.

CONCLUSION

Thus, using the proposed method for producing a metal-quartz composite material, a new generation material will be obtained for hydraulic cylinders of machines and equipment, the durability of which will be substantially higher than the existing ones, while the costs of their production will be reduced by 25-30%.

REFERENCES

[1] Strnad Z. Glass-crystal materials. trans. from Czech. M. 1988.
[2] Tavasiev R.M. Patent of the Russian Federation 2263593. The working body of the hydraulic brake systems.; declare 11/18/2002; publ. 10.11.2005, Byul. №31. 2.
[3] Tavasiev R.M., Tseboev E.A. The use of new material in the cylinders of hydraulic actuators. Technique in agriculture. M., 2009; 1: 35-37.
[4] Tavasiev R.M., TseboevE.A., BalikoevV.T., FidarovA.F. RF patent number 2389622. Hydropneumatic cylinder; declare 10/15/2008; publ. 20.05.2010, Byul. №14. 3.