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A Simple Way to Control the Torque and Turns the Electric Motor

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ABSTRACT

The article deals with the problem of using the most economical, the synchronous motor in the industry. A variant of deep speed control with proportional change in the output torque of the synchronous motor. The material is based on the author's patent RU 2518072 and Patent Application in India Ref: 45010719101/ 45010700154

Keywords: synchronous motor, planetary differential, double acting electrical machine, electric induction connection, torque moment.

INTRODUCTION

Some sources implies that thirty percent of the world's electricity is spent on the drive pumps for pumping fluid. This is mainly production costs. Often the adjustable flow rate and maintaining the pressure in the line occurs using the bypass valve. When the pressure above the nominal, the valve automatically is opened and liquid from the high-pressure pipe, is bypassed on the suction pipe upstream of the pump. Electricity is wasted. When the turns motor speed control by varying the frequency of the current, gets lost part of the electric power. With deep change of revolutions, these losses may reach ten percent. But the flow rate of fluid in the mains variable quantity. The maximum flow rate, which should provide a pump, usually not more than five percent of the time of operation. All rest of the time system does not work optimally. The volume of fluid intake varies tenfold. At night, for example, water supply to the houses should be almost nothing. Water consumption can be reduced at the hundred or more times, but the line pressure should remain constant. This gives rise to great losses of electricity.

PROBLEMS USING SYNCHRONOUS MOTOR

Asynchronous electromotors, which is most widely used to drive pumps in the world, less efficient than synchronous ten percent. Synchronous motors economical in the operation. Synchronous motors have a high overload capacity. In addition, in the synchronous motor have the opportunity to obtain the optimal mode of the reactive energy, which is carried out by automatic regulation of the excitation current of the motor. Synchronous motors are less sensitive to fluctuations in voltage than asynchronous. But synchronous motor has no starting torque. The rotational speed of the synchronous motor remains unchanged at any load on the shaft within its overload capacity. When load is more synchronous motor exits from the synchronism and stops. This disadvantage does not allow full use of the synchronous motor in the industry. Its main advantage is that it is most economical from the used in industrial motors.

THE CONTROL DEVICE SPEED AND TORQUE OF THE ELECTRIC MOTOR

For efficient and economic speed control of the output shaft when using the synchronous motor (but also asynchronous or otherwise) can use a simple mechanism which is coupled with the motor itself. The rotor speed of the motor remains constant, and the revolutions of the driven shaft are changed automatically, depending on the the load change . Proportional reduction of revolutions of the driven shaft, torque increases. The use of such devices of the motor can be quite varied. Traction electric motors on transport that require high starting torque. Start-up of powerful fans, draft machines, cooling towers, gas-compressor units, in many cases takes place with the use of expensive devices that are not working in the optimal range. From centrifuges before the mining machinery to

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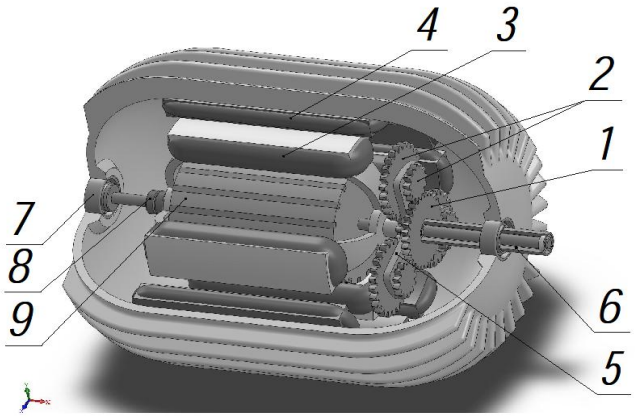
everywhere you need to manifold increase in torque at start-up and during operation. In many mechanisms, and the pumps, it is necessary to control power and turnovers, minimizing, the losses.

This result can be obtained if the inside of the motor rotor establish the additional rotor and combine inductively with the motor rotor, and with the differential as shown in Figure 1:



1. The central wheel connected to the driven shaft. 2. Satellites. 3. The rotor winding. 4. The stator winding. 5. The planetary carrier of the differential. 6. The output shaft. 7. The bearing 8. The slip rings of the rotor winding. 9. The second rotor.

Fig1.

Input of the differential connected to the rotor of the motor, which is the carrier of the differential. One output of the differential transmitting more torque is connected to the driven shaft 6, and the second output of the differential transmitting less torque and rotating in the opposite direction to the second rotor 9 which is inside the motor rotor and coupled thereto through inductive coupling. The differential is connected so that , the second inner rotor tends to rotate in the opposite direction rotation of the rotor of the motor. But the mutual relative rotation between the rotors a force of counteracting for the mutual slipping. Differential partially blocked, the output shaft is accelerated. From the force linking the two rotors depends the acceleration rate, torque changes on the driven shaft and the output shaft turns in depending on the load on it. At the same time the the rotor of the motor has a constant rotation speed. If the inductive coupling between the rotors decreases, slippage between the rotors is increased to a full stop of the second rotor (and further with the transition in the opposite direction of rotation), the torque increase to a maximum value. The speed of the rotation of the output shaft decreases.

DESCRIPTION OF THE MODELS

It was made a model unit. The device shown in Figure 2.

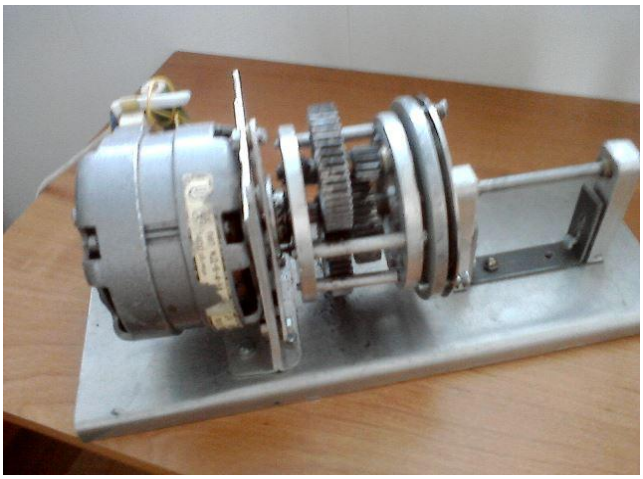


Fig2.

The reducer has been taken out of the engine. and the role of the second rotor served clutch. The gear ratio of the planetary gear unit is sixteen. At start-multiplied torque on the motor current does not increase above the nominal 1.3

CONCLUSION

The use of such devices the electric motors saves considerable amount of electric power facilitate management of work pumps, to reduce manufacturing costs. Its use will be useful in other areas of economic activity, such as engineering, construction, transport and others.

REFERENCES

[1] R.G.Khadeev (2011) Electric Motor with Controlable Speed and Torque, Russian Engineering Research,1,13-14

[2] R. G. Khadeev.(2015, 3, Issue 7, July 2015, PP 1-4) International Journal of Emerging Engineering Research and Technology. Hybrid Vehicle Power Train

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Ravil Khadeev, was born on January 1, 1945. Until 1993 was a military a fighter pilot, PhD, graduated from the University of specialty - theoretical physics. Worked in the Scientific Research Testing Institute of Military Medicine, is now working in a private company. The chief technologist for the production of composite materials.