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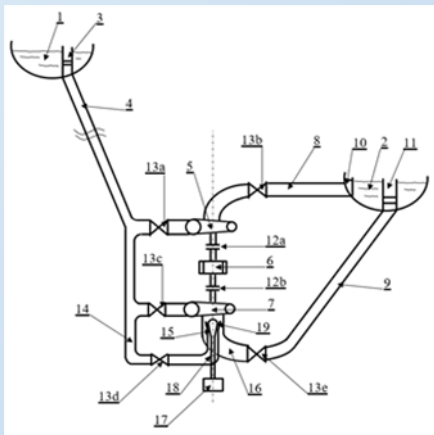
Offer № 014PA

**Water storage electric power plant
with controllable suction head**

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A water storage power plant with controllable suction head has been invented, which finds application in modern power systems and is used as a source of balancing/regulating energy and auxiliary services. For the invention a patent has been issued in Bulgaria.

Application № 113168



Pump storage hydroelectric power plants are the cheapest and most versatile source of balancing/regulating electric energy and all kinds of auxiliary services in modern electric power systems (EPS). The most commonly used units comprise three machines: turbine, generator/motor and pump. In order to ensure motor and pump start up without shock loading for the unit and for the EPS, special devices are required (used): a starting motor or start-up turbine, starting transformer, start-up frequency converter, etc. More effective and safe start-up for the pump and the motor can be realized by the proposed invention. It also provides easy and continuous adjustment (control) of the pump load.

Technical solution

The invention complements the known hydraulic scheme of the three-machine (ternary) units, where at the end of the pressure pipeline coming from the upper reservoir, branching into two sleeves, a third branch (another sleeve) is provided. This third sleeve consists of a pipeline, a valve and one or a set of injector-suckers (ejectors), which is installed in the pump suction between the impeller and the shut-off valve of the suction pipeline.

One function of the injector-sucker (ejector) is to inject water from the pressure conduit and simultaneously suck water from the lower reservoir. Its other function is to change the pressure and velocity of the water in front of the pump impeller, and the third is to impart vorticity to the flow in front of the impeller.

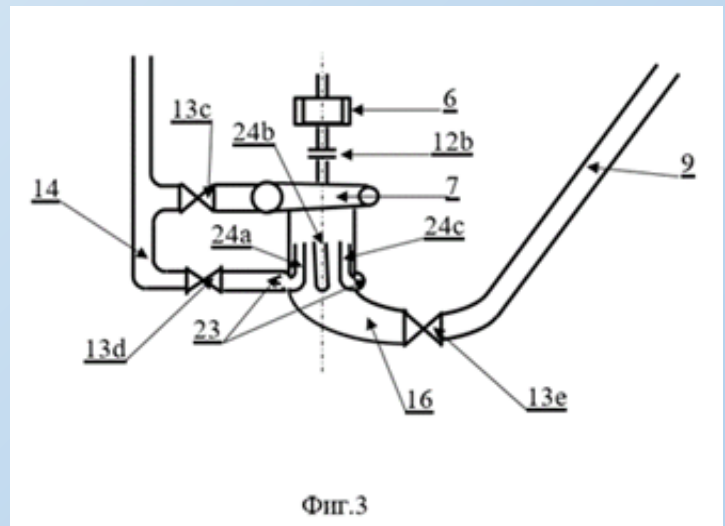
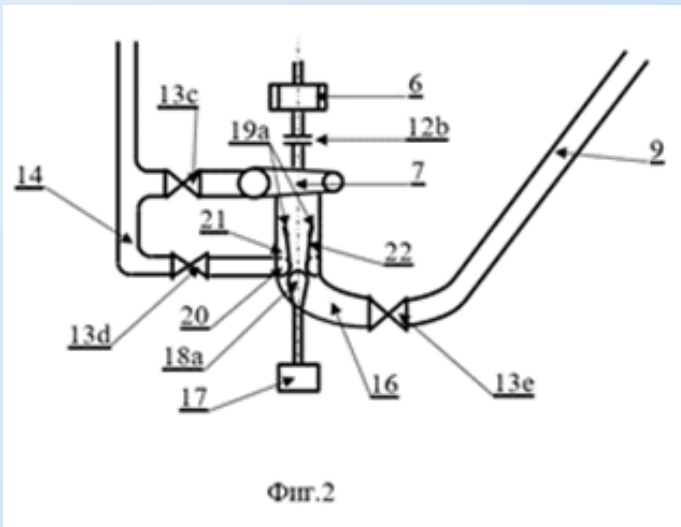
Application and advantages

The invention is applied to replace the auxiliary installations and apparatuses in the known pump storage water power plants used for starting the motor and the pump, as well as for regulating their power.

The advantages of the invention are:

- start-up and shut-down of the pump without shock loadings on the machine parts and without disturbances in the EPS as a result of practically equal water pressure at the inlet and outlet of the pump impeller;
- turning on and switching on the motor-pump without auxiliary start-up devices applied in the known three-machine pump power plants (starting motor or starting turbine, frequency converter, starting transformer or voltage switch, installation for pushing the water out of the pump by means of compressed air, etc.);
- adjusting (control) of the motor load in real time according to the needs of the power system for balancing/regulating energy and auxiliary services, depending on the economic and technical conditions in the power market.

Technological images



Contact for this offer



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