IMPROVING THE WORK EFFICIENCY OF HYDROTRANS.

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ANNOTATION

The article takes a closer look at the working principle of the hydrotherapist and suggests ways to increase productivity. The use of hydropower and its use as an alternative energy, in particular, to increase resource savings in hydraulic fracturing, which performs this function, is a topical issue.

***Keywords: Hydraulic, Hydraulic, Forged Valve, Pressure Valve, Air Cap, Surface Tension, Surfactant, Supply Pipe*.**

Nature has gifted us not only a free energy source in the form of falling water, but also a simple way to convert natural gravitational energy. From a physical point of view, the potential energy of water is the gravitational energy itself. The potential energy of water can be used not only to increase its rate of descent, but also to raise it. In other words, a certain method of energy conversion based on the use of falling water should be as simple and natural as android, another method of energy conversion that allows water to rise without the use of any external energy. A much more advanced step has been taken to find such a modification method.

The phenomenon of hydraulic shock was known to science in the twentieth century, on the basis of which the device began to be called a hydraulic crane. The theory of this phenomenon was first developed by Russian scientist Nikolai Zhukovsky. In 1898, his theory was first published.

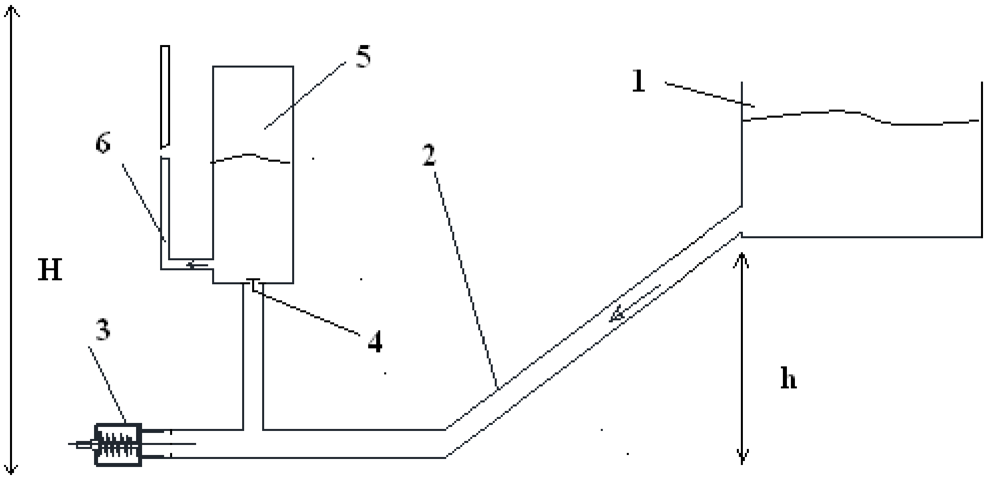

Figure 1. 1 reservoir (reserve), 2 supply pipe, 3 forging valve, 4 pressure valve, 5 air cap, 6 outlet pipe. h is the height of the water reserve, H is the height of the rise of the water.

A general schematic view of the hydrotherapist is shown in Figure 1. If we look at the hydrotaran with its discovery and improved options so far, the general principle of operation has not changed. [6] It would be wrong to say that the automatic operation of a hydrotherapist is only a product of hydraulic fracturing, and this idea cannot be fully justified. Zhukovsky's formula for the formation of hydraulic shock:

$$P_{\tilde{a}.ç} = \tilde{n} \cdot \vartheta \cdot \rho \quad (1)$$

$P_{\tilde{a}.ç}$ - pressure under hydraulic shock. the velocity of s-sound in water, ϑ - water flow rate, ρ - density of water.

Hydrotaran efficiency:

$$\eta = \frac{H-h}{H} \cdot 100\% \quad (2)$$

If we observe the performance of hydrotrans, [2] the magnitude of the efficiency in it decreases with increasing output height-H. At the same time, there is an increase in water wastage, which leads to a decrease in the volume of water in the outlet pipe-6. The increase in water (resource) wastage is explained by a decrease in the efficiency of the device.

The content of the experiment is as follows: When the water (reserve) moves through the water supply pipe-2 in the reservoir-1 (ϑ) speed and (P) pressure, the percussion valve-3 at the end of the pipe, when closed (Fig. 1), the first particles of water as the velocity decreases, their kinetic energies are converted into the deformation work of the pipe walls and the fluid. In this case, the liquid has to increase, albeit slightly, due to compression, and this compression produces a very large amount of shock pressure $P_{\tilde{a}.ç}$. The walls of the pipe are then stretched and the liquid is compressed according to the additional pressure $P_{\tilde{a}.ç}$ formed.

The first particles are followed by neighboring particles, and their velocities disappear. The resulting pressure increase limit is compressed by the rate of propagation of the shock wave from the percussion valve-3 to the reservoir-1. The area that changes pressure $P_{\tilde{a}.ç}$ is called the shock wave. When the shock wave reaches the supply vessel, the liquid is stopped and compressed all over the pipe, and the walls of the pipe are stretched. The increase in pressure forging is distributed throughout the pipe. Under the influence of this fluid pressure difference $P_{\tilde{a}.ç}$, air begins to flow from the pipe through the pressure valve-4 to the cap-5, and its direction is reversed, leaving the restored flow behind. P_o - as the pressure is restored, the fluid and the pipe return to their original state. The liquid mass tends to break away from the percussion valve-3. As a result, when the percussion valve-3 is fully closed, a negative shock wave moving at s-velocity is generated in the vessel, which reduces the pressure to $P_{\tilde{a}.ç}$, narrows the pipe walls, and expands the liquid under the air cap-5. In the experiment, the cycle is repeated. So what is the reason for this?

Once the volume of water under the influence of the shock wave $P_{\tilde{a}.ç}$ generated against the flow velocity enters under the air hood, that volume of water becomes a participant in a new system other than the one in which it was previously. This is because the shock wave in the water collects under the air hood and is extinguished here. In other words, there is no direct involvement of the hydropower in the rise of water in the hydraulic tank (extinguishers are an example in the fight against hydrotherapy).

The derivation of the formula for the efficiency of the hydraulic tank in formula (2) is not directly related to the dependence of the hydraulic pressure in formula (1). (2) The formula is derived from the isothermal compression process of the universal gas law.

The rising of the water is done by another system. This can be explained as follows.

To determine this, we consider the boundary of the water and air layer under the air cap of the hydraulic tank Figure 2.

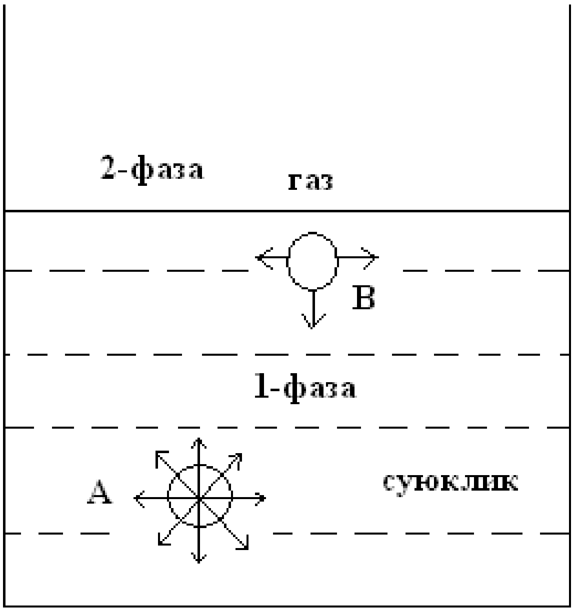

Figure 2. Water and air boundary phase.

If the intermolecular interactions at the phase boundary are different, the system will consist of different phases [2]. In a system consisting of a liquid phase 1 and a gas phase 2, the force of intermolecular interaction is in the liquid F_{1-1} the force of intermolecular interaction in a gas F_{2-2} will be greater than. $F_{1-1} > F_{2-2}$ Since the A molecule located in the interior of the liquid is surrounded by all other molecules, the forces of interaction are mutually equal. The V molecule on the interfacial surface is affected by liquid molecules on the one hand and gas molecules on the other. $F_{1-1} > F_{2-2}$ as long as the resulting force R directed towards the depth (bottom) of the liquid appears. This force is often called pressure.

$$P = F_{1-1} - F_{2-2} \qquad (1)$$

The greater the difference between the intermolecular interactions in the boundary phases (surfaces), the greater the internal pressure.

The molecule on the surface of the liquid is affected by 2 different forces (Figure 2): the forces in the gas phase and the forces in the liquid phase. Because the intermolecular distance in the gas phase is large, their gravitational force is less than the gravitational force of the molecules in the liquid. Therefore, the molecule on the surface of the liquid moves into the liquid as much as possible. This is why any liquid tends to shrink its surface. This in turn creates internal pressure. It is this internal pressure that is the force that prevents the volume of the hydraulic wave in the hydraulic tank (Fig. 1) from reaching below the air cap-5.

In general, because there are molecules on the surface of any liquid where the intermolecular gravitational forces are unbalanced, in the outer layer, (interfacial) surface energy is generated. This energy constantly tends to decrease.

In order to gain the surface of the liquid, its surface (under the air cap) must overcome the free energy. That is, it is necessary to spend work from the outside (at the expense of hydraulics).

If a system consists of several macroscopic parts that are separated from each other by a boundary surface, it becomes a heterogeneous system. On such surfaces, some parameters change with the jump as well as the surface tension (surface tension can be strictly constant in the absence of a heterogeneous layer on the water) [2, 5].

Hence, due to the fact that the pressure of the hydraulic tank under the closed system air cap is higher than that of the small surface, the coefficient of surface tension on the surface of this part of the water decreases. This in turn becomes the area of the hydrotherapist under the air cap that receives the shock waves generated in the entire system. Here the shock waves are completely extinguished and a short stop occurs, covering the water in the wave volume. The percussion valve-4 under the air cap is in the closed position at this time. The air cap-5 is disconnected from the system connected to the supply line-2. This suggests that the direct involvement of shock waves in the rise of water in the hydrotherapist is not observed.

It is reasonable to say that the automatic operation of the hydraulic tank is due to the fact that the surface tension coefficient of the surface layer changes as a result of the constant, compressive deformation of the mixed gases under the air cap.

It can be said that the accumulation of hydrosarb under the air cap in the hydrotherapist is due to the variation of the coefficient of surface tension.

Hence, taking into account the above, in order to increase the working efficiency of the hydraulic tank, it is necessary to reduce only the surface tension coefficient of the water under the air cap using a surfactant. However, if the surfactant is distributed over the entire volume of water, it leads to a decrease in the viscosity of the water [2; 3; 4]. This leads to a decrease in natural cavitation. As a result, there is a decrease in productivity in hydraulics. For this purpose, it is only advisable to add a water-insoluble and non-sedimentary surfactant under the air cap of the hydrotherapist. It is recommended to use paraffin or some oils as such surfactant.

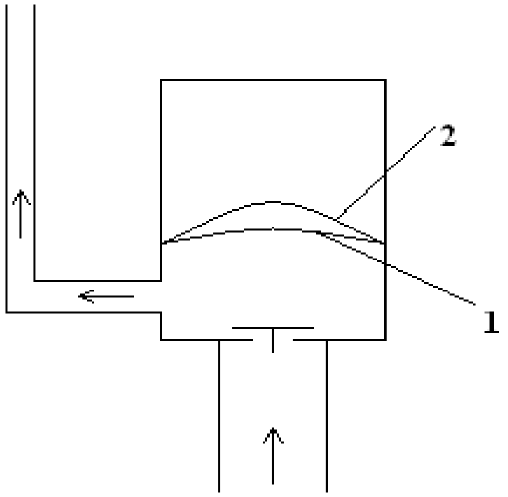

Figure 3. During the operation of the hydraulic tank, the water under the air cap is: 1- when no surfactant is used, 2- when surfactant is used.

By reducing the surface tension coefficient of the water surface, an increase in the amount of water covered under the air cap is achieved. In Figure 3 (cases 1 and 2). As a result, according to the law of conservation of energy, the initial consumption of energy in a hydraulic tank, the consumption of relatively more water, can lead to an increase in work efficiency. In short, this method can be used to increase work efficiency without making any changes to the design of the hydraulic tank.

BIBLIOGRAPHIC LIST

Basic literature

1. Collid chemistry. N.I.Fayzullaev, N.Q.Muxamadiev. Sano-Standard Publishing House. Tashkent-2016. (Pages 23-24, 28-29, 69, 23-102, 182-232,)
2. Fluid and gas mechanics. X Khudoynazarov., A Abdirashidov. State Enterprise "Zarafshon" publishing house. Samarkand-2017. (Page 32)

Additional literature

1. Issues in Physical and Colloid Chemistry. T.Kholdarova, J.Haydarov "Tafakkur Bostoni" Tashkent-2015. (Pp. 239-283.)
2. Water chemistry and microbiology. M.Xodjitdinova, A.Rizaev. Yangi Nashr Publishing House. Tashkent-2010. (Pp. 86-89.)

Foreign literature

1. International patent database on the Internet. Special sites for hydrotaran. www.patent.su, www.caspatents.com.