

DEVELOPMENT OF ALTERNATIVE POWER-PLANT IS FOR A TRANSPORT

Abstract. In the article stated the comparative analysis of means of accumulation the power, using for their work preliminary accumulated power. Also has considered opportunity of manufacturing and uses untraditional, principle new, highly effective flywheel source of energy which non-polluting and safety. It has been presented the methods of calculation the flywheel power generator.

Keywords: power, accumulator, power generator, gravitation, mass, satum power, flywheel

1. Introduction

There is a big variety of accumulators of power in engineering. Mechanical include spring, rubber, pneumatic, pneumatic- and spring- hydraulically accumulators, power accumulators as the lifted cargo, and at last, flywheel or inertial accumulators. Also exist thermal accumulators, accumulating huge power in a unit of mass, and allocating it as thermal. Each of them is good in its own way and has its area of use. The actual task is development and uses for a drive of working body combined accumulators of power and power assemblies in modern machines.

2. Statement of problem

The inertia of rotation showing the most brightly in work of flywheels, it very widely used in engineering in particular in hydraulic drive of self-propelled machines and their equipment which work by live load. Reserved in flywheel the power by a little loads of working member then realize by higher loads. Hydrostatic transmission of machine allows to carry out charging inertial accumulators when driving downhill and then to use reserved energy at movement on horizontal way or on rise. It is difficult to name the machine which hasn't flywheel or similar detail - a massive pulley, a toothed wheel, a friction. The accumulation ability of flywheels is one thousand times larger then electrostatic, electro-dynamics and electrochemical accumulators. But, when required to accumulate some of power and excrete it as electrical then named above electric accumulators are able to turn out more effective. By this the flywheels high-power generators are much more effective, than the battery of condensers or throttles of the same capacity. In particular one of the perspective method of uninterrupted submission, transformation and preservation of any kind of energy is development of new power-plants which on design and by principle of work would spent energy

carriers as small as possible would kept autonomy in work, would be ecologically safe without service.

The purpose of the work is development of inertial model, flywheel generator for creation and simultaneously accumulations power for hydrostatic drive of machines used in engineering practice.

3. Analysis means of energy accumulation

From mechanical accumulators as engines can be used practically all, but with different efficiency. Spring accumulators are widely applied as clock engines, toys, various devices for giving beginning pulse of movement flywheel. Spring engines accumulate small amount of power in mass unit, in thousand times it is less than flywheels from the same material. The same parameters have also spring-hydraulic accumulators, with that difference, that the energy which has been saved up in spring, is allocated with pressure of working liquid. In this case the work is made by hydraulic engine of this or that type. Electrochemical, pneumatic, pneumatic hydraulic and flywheel accumulators for today are actively applied as engines of machines. The general feature which characteristic for accumulators of these three types is high specific power consumption. Useful energy which has been saved up by these accumulators - hundred thousand joules of energy in kg mass of accumulator. In order to use it as mechanical the electrochemical and pneumatic accumulators or just balloon with compressed gas is necessary to have electric or pneumatic (hydraulic) engine.

Usually any engine is not necessary in any engine for flywheel the allocation of energy occurs by shaft rotation of flywheel. The unconditional advantage of flywheel accumulator or engine on its basis is in it. The assignment of flywheel is a bit another in so-called shock action machines where inertia is used for product of mechanical work: in various splitting up and metal cutting assemblies, rolling mills, presses, scissors. During of working course such machines the flywheel take place power

slowing down, the dispersal is made by the special engine smoothly, in piston machines all occurs is contrary. In these two cases inertia of flywheel make possible work of the machine - the kinetic energy which has been saved up at dispersal, is used at slowing down.

When it is said about terms of preservation (conservation) of power there are pneumatic accumulators on the foreground pneumatic accumulators act and it is possible to keep the energy of the compressed gas for many years. Electrochemical accumulators concede here to them and flywheels in spite of the fact that laboratory samples allowed the storage of energy for week and months, have to recede on the third plan. But by consideration of such parameter as specific capacity the flywheels again come out on the top with a huge stock. There is no engine or accumulator, capable to develop so big capacities as a flywheel. The capacity developing by a flywheel, is practically boundless and it is limited only by opportunities of transmission. The second place belongs to pneumoaccumulators here, the third - to electrochemical accumulators having, as it is known, not high specific capacity. Analogy to

duration charging, dependent on specific capacity of accumulator. Modern flywheel engine has the best parameters on reliability, durability, efficiency and influence of temperatures.

The most important ability of that or either engine or accumulator is to recuperate machine's energy. Here the first place belongs to flywheel though the pneumatic and electromechanical accumulators also are capable to recuperate the power. In accumulators of all three types there are big prospects of growth of useful parameters and in the first place of specific power consumption. The greatest prospects as it is marked above, have flywheels. It is tied in the first place with creation of super flywheels from over-tenacity threadlike materials.

Good prospects of growth of power consumption have the electrochemical accumulators too which have enough high parameters. Prospects of pneumatic accumulators are more modest and they depend basically on creation of over-tenacity and light cylinders from the same threadlike materials.

The approximate data on power consumption of some accumulators with use of materials of

D.V. Rabenhorsta are resulted on Fig 1.

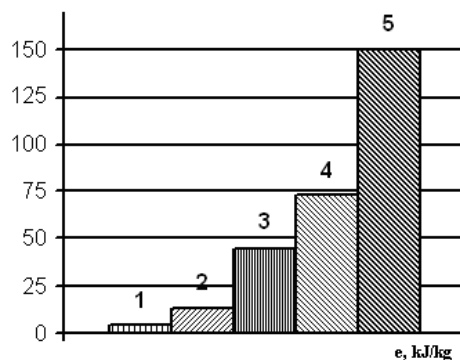


Fig. 1. Power consumption of some accumulators of energy
 1 - steel shroud; 2 - acid accumulator; 3 - super flywheel from modern materials;
 4 - sodium-air accumulator; 5 - perspective super flywheel

These data unequivocally testify to high perspectivity of flywheels engines. And it is doubtless, that many machines of already near future will be led simple, reliable, economic and not polluting of environment - flywheel engine.

The subject of the given research is establishments of appropriateness of interaction of mobile weight with flywheels of the device.

4. Statement of basis material of research

Taking into account a complexity of proceeding processes and physical objects interactions and also the stated task having been worked out the model of

experimental installation which can be named "satum flywheel generator of gravitational action - SFGGA". Given power aggregate uses the energy of gravitational power field as a primary pulse for the beginning of work as well as any other mechanical accumulator of power. The principle of the device's model consist on the basis of fundamental laws of physics (dynamics) - constantly change of energy's density of the power carrier (mass) due to change of speed and direction of movement at its interaction with flywheels without breaking gravitation's laws. It is known, that the mass is equivalent to energy. One kg of weight is

approximately equal $8,98755 \cdot 10^{16}$ J of energy [8]. Therefore mass is named - the power carrier.

This device will be working within the action of gravitational field.

Let's consider the bases of method of force calculation and the constructive scheme of model power generator.

Research the scheme of forces which operate on elements of design Fig 2.

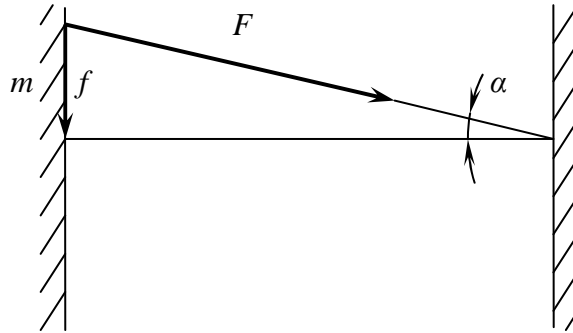


Fig. 2. Scheme of working forces

Calculation is spent basis on formulas:

$$F = \frac{f}{\sin \alpha} = \frac{m}{\sin \alpha} \quad (4)$$

$$m = f ; \quad (1)$$

where F – force; α – a corner between mass and force; f – gravitation force of mass; m – mass of flywheels.

$$\frac{m}{F} = \sin \alpha ; \quad (2)$$

Results of calculations it is brought in Table 1.

$$f = F \sin \alpha ; \quad (3)$$

Table 1

Force calculation of flywheel

α degrees	$\sin \alpha$	F	α degrees	$\sin \alpha$	F	α degrees	$\sin \alpha$	F
30	0,5000	1,50	9	0,1564	4,80	3'	0,0008	938,00
29	0,4848	1,55	8	0,1392	5,39	2'	0,0005	1500,0
28	0,4695	1,60	7	0,1219	6,50	1'=60"	0,0002	3750,0
27	0,4540	1,65	6	0,1045	7,18			
26	0,4384	1,73	5	0,0872	8,6	50"	0,0001667	4499
25	0,4220	1,78	4	0,0698	10,74	40"	0,0001334	5622
24	0,4067	1,80	3	0,0523	14,34	30"	0,0001001	7492
23	0,3907	1,92	2	0,0349	21,49	20"	0,000068	11029
22	0,3746	2,00	1-60'	0,0175	42,86	10"	0,0000335	22388
21	0,3584	2,09				9"	0,00003015	24917
20	0,3420	2,19	50'	0,0145	51,70	8"	0,0000268	27985
19	0,3256	2,30	40'	0,0116	64,66	7"	0,00002345	32051
18	0,3090	2,43	30'	0,0087	86,20	6"	0,0000201	37313
17	0,2929	2,56	20'	0,0058	129,30	5"	0,00001675	44910
16	0,2756	2,72	10'	0,0029	258,60	4"	0,0000134	55970
15	0,2888	2,90	9'	0,0026	283,50	3"	0,0000105	71428
14	0,2419	3,10	8'	0,0023	326,10	2"	0,0000067	111940

13	0,2250	3,33	7'	0,0020	375,00	1"	0,0000035	214285
12	0,2079	3,60	6'	0,0017	441,00			
11	0,1908	3,93	5'	0,0014	536,00			
10	0,1736	4,32	4'	0,0011	682,00			

In accordance to values in Table 1 we build the diagram of the force's dependence from the angle of position of the stem concerning the top position, a point 0, Fig 3. The stem from starting position (t.0), moves to point 8, downwards (Fig 4). When calculating the constructional scheme of the model the coordinates of passage floating mass from 0 - 8 we design using, formulas:

$$a_n = a_1 + d(n-1), \text{ mm} \quad (5)$$

$$S_n = \frac{a_1 + a_n}{2} n, \text{ mm} \quad (6)$$

where $a_1 = d = 1,16667$ mm; $n = 8$ – quantity of center points of bow; S_n – responsible to diameter of circle of rotation mass; a_n – center of bow of path of movement mass.

Analyzing the diagram of dependence ranges we draw a conclusion that the mechanical force from mass depends on the angle of position of the stem. In accordance to the constructive scheme, Fig 4, the minimal value of force will be in a point 0, and maximal in a point 8. Therefore, the construction of power aggregate provides lags of the stem in a point 8 as it is possible longer at rotation of flywheels that responds to the maximal value of density of power bearer in volume of space. Simultaneously the length of the web will be the greatest too.

And as consequence the values of work also will be maximal. When working the pattern its details carry out complicated motion: the flywheels gyration around their axis and cam shaft with the stem

oscillate in horizontal from the centre and back between two flywheels constantly operating on them with the certain force. It is stipulated by the construction when rotation the flywheels takes place compulsory own substitution of web under the action of mass. And the force which operates on flywheels is much more the force of frictional resistance.

After calculations, elaboration of drawing and making of details it is created the physical model of the device (Fig 5).

While working the flywheel generator of gravitational action (as a group of interaction physical objects) occurs constantly change of objects motion (speed and direction), therefore takes place constantly change of power's closeness. This idea is the base of working up the flywheel generator of power gravitational action which in its turn capable and to accumulate the power too.

5. Conclusions

On the basis of observations, accumulation, comparison of analysis of real factors of an environment and various information sources the force calculation has been carried out the pattern of flywheel generator of gravitational action has been worked up and has been stated main principles of interaction energy of mass with flywheels in the gravitational field. The developed model of flywheel engine is not closed there may be continuous movement and processes in it in which energy constantly revives and accumulate. If energy revives without additional expenses we will receive the necessary generator and accumulator of power.

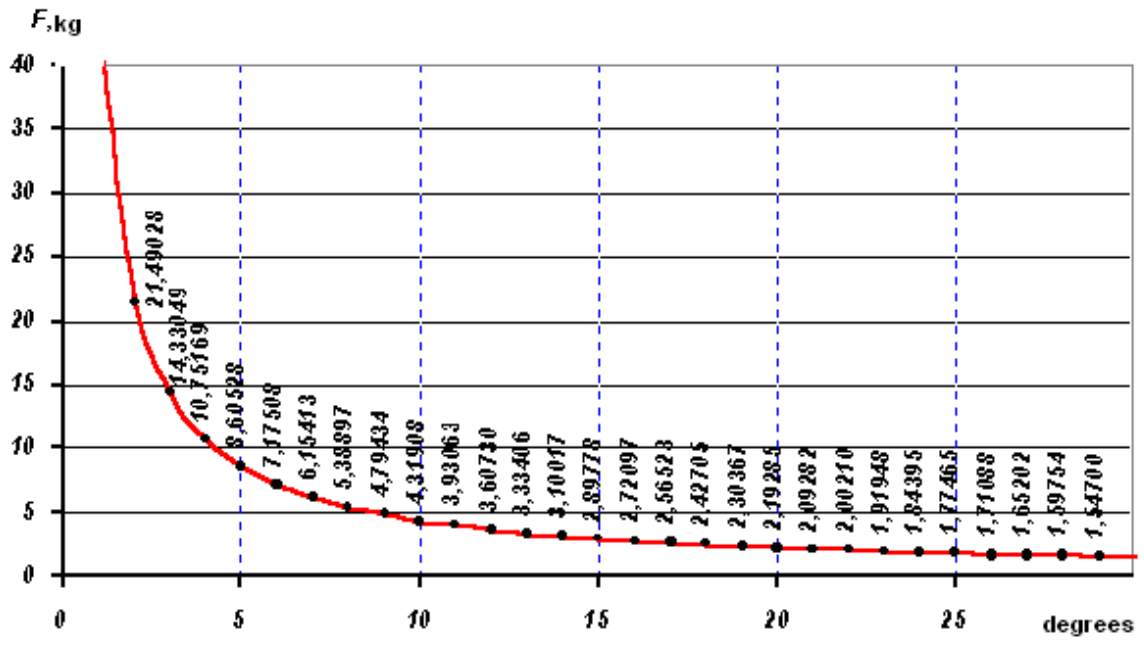


Fig. 3. Diagram of dependence of force from the angle position the stem

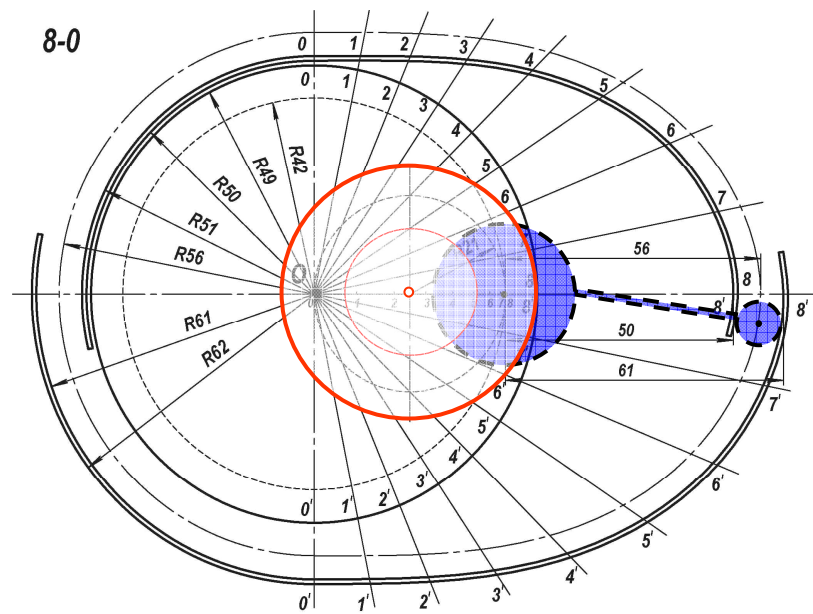


Fig. 4. The constructive scheme of the model flywheel generator

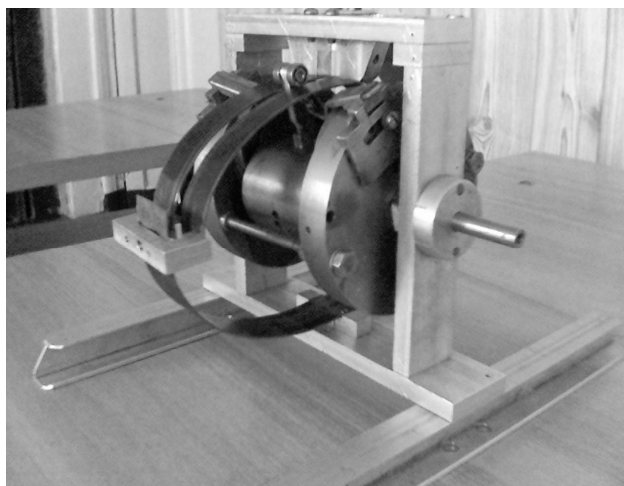


Fig. 5. View of model flywheel generator gravitational action

The flywheel generator of energy of gravitational action converts power in that, which it is necessary for us at present moment in the present case.

It is clearly that similar power sources don't solution up to the end all problems of power engineering, but show one of ways of stable get of power without fuel expended as a matter of fact the floating mass is power-bearer. The advantage of flywheel generator is opportunity of constant perfection and accessible construction to realization, the independence from area of use receipt and opportunity of accumulation practically including hydraulic power.

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