Title of the Invention

Means and Device to Create Driving Force Converting Rotary Motion into Forward Motion.

The Field of the Invention

The invention is referred to means and devices to convert rotary motion of rotating medium along a special trajectory inside the device, into forward motion of the whole device and can be used to create propulsion systems and new means of transport.

Description of the Prior Art

As science and technique developed, they suggested different means and devices of exerting a driving force, which differ fundamentally from jet engines by the fact that they do not require jet rejection of mass beyond the device case to exert driving force. In 1926 G. Shifershtein acquired a patent No 10467 for transport, using oscillatory load. In 1934 M. Kolmakov in the inventor's certificate No 45781 has described a carrier that needs no binding with the road, as it moves due to inertia. In 1961 S. Kuptsov and K. Karpuhin acquired the inventor's certificate No 151574 for a self-propelled system with eccentrics, which create centrifugal forces. The theoretical basis of these means, which is necessary to develop these technologies, continues nowadays and needs analysis of physical meaning of inertia, needs the development of inertial mass notion as a result of interaction with physical vacuum, which, in modern theories, is considered to be a peculiar medium. The example of the theory is a means and a device, described in the USA patent No 5280864 [1]. The devisers consider a method of short-period alteration of the objects mass, which occurs when the vibration process is combined with the charge- discharge of electric condenser, as development of the relativistic theory of gravity.

Some other engineering solutions describe ways of traction production due to the conversion of mass rotation into unilateral impulse or constant traction force. In most cases the devisers exert traction force in mechanical devices due to asymmetrical centrifugal (centripetal) force. In this case the non-compensated force is usually aimed radially in the plane of rotation to the gradient of the centrifugal force. This gradient is provided by constant or controlled alteration of the radius of rotation of solid/ liquid substance. For example, the summary of the invention (inventor's certificate No 589150) describes a way of the unbalanced centrifugal force exertion by means of the rotation radius alteration of the mass, rotating along the inner surface of the case.

The USA patent No 4631971 [2] describes a device with two diametrically set masses, each of them travels along a non-symmetrical trajectory, with the altering distance to the rotation axis; as a result, there appears asymmetry of the centrifugal force in the plane of rotation. The USA patent No 5427330 [3] considers a similar device, where the radial attachment of the rotating mass automatically extends or shortens on the different areas of the trajectory that generates non-

symmetric centrifugal force and provides the system motion as a whole. The USA patent No 5782134 [4] describes a tractive generator in which one-way traction in the plane of rotation is generated due to the controlled imbalance of the centrifugal force that makes it possible to exert a driving force in arbitrary direction, also in the plane of mass rotation.

The periodical tractive force, axially oriented, is exerted in the device [5], where the radius of rotation of the two symmetrical massive solid mediums changes periodically.

Solid rotating masses used as eccentrics limit the resources of the suggested systems because of the breaking point of the structure. There are other engineering solutions, using liquid as a working medium. [6]. The complexity of the system, that requires an intense magnetic field and a source of the electric field for magnetohydrodynamic effect limits the area of the patent application [6].

A simper method is described in the USA patent No 3979961 [7]. This method involves rotating liquid, which, in the certain place of its trajectory, hits a reflecting device and transfers its impulse to the case of the structure. As a result of an imbalanced centrifugal force, a constant tractive force exerts in the system. The effectiveness of this method is limited by a small amount of liquid, involved in the impulse transfer to the structure case during the interaction with a reflector.

In [8] Spartak Polyakov and Oleg Polyakov described a method and a device to exert axial tractive force with the altered radius of a gyroscope rotation, and they also published their experimental data. In accordance with this method, the working mass (the gyroscope) is set in rotary motion, and then the radius of rotation, being the controlled parameter of the working mass, is altered. When the radius of the working mass rotation is lowered, there appears a propulsive burn, directed along the axis of rotation. It is clear, that the alteration of the working mass radius can be only periodical; therefore, the exerted tractive force has an impulse nature. When the working mass returns to original position, characterized by the maximal radius of rotation, the tractive impulse is nil.

There is a device, which converts rotary motion into forward motion in one direction; it is described in the Russian Federation certificate for a utility model No 20946 [9], which the closest in character to the applied invention.

The device consists of a case and a tool, connected with it to impart rotary motion to the working mass. The device is a converter of rotary motion into forward motion in one direction. The converter has a basic element of rotation that presents a tube in the form of a cone- shaped spring, a coaxial longitudinal axis of the device, a pump and liquid mercury in the tube and in the pump. The outlet pipe of the pump is connected to the tube on the side of the conical spring base,

and the outlet pipe – at the top of the spring cone. The pump is connected to a drive engine with an autonomous source of energy. The case of the device is fitted with mounting elements to connect it to the mobile object; in that case the converter of rotary motion is fitted with a pump, and the basic rotating element presents a tube in the form of a cone- shaped spring, which is coaxial to the axis of the device. The cone- shaped spring can be one-thread and screw. The pump is coaxial to the axis of the device.

When the device is turned on, the drive, connected to the pump and the basic rotary element, switches on. The tube in the form of a cone-shaped spring starts to rotate, dragging the mercury. At the same time, the pump returns the mercury along the axis of the device from the base of the cone- shaped spring to the top of it.

By this means, the mercury constantly travels along the tube in the form of a cone- shaped spring. Due to the fact, that in the initial period of rotation there is speed differential of the mercury and the tube itself, there appears propulsive burn, axially oriented.

Still, such kind of interaction between the liquid and the tube provides a short term propulsive burn (ranging from several seconds to a minute), which eliminates in the moment, when the speed of the liquid equals the speed of the tube rotation. The experiments with this device have been described by one of the devisers, V. A. Menshikov in the article [10].

Thus, this device provides conversion of the liquid rotary motion into the forward motion of the structure, that is the impulse of the useful one-way tractive force, which operates only during a small period of time, that is why this device cannot be effectively applied in the structures that demand continuous running, e.g. in carriers.

The objective of the applied invention is to generate constant tractive force with efficient conversion of kinetic energy of the rotating mass into the forward motion of the system as a whole. As the effectiveness of such systems is in direct relation to the speed of the working mass rotation, then liquid, gaseous, granular or plasmous rotating mass will allow increasing specific properties of the device in comparison with the devices using solid gyrating masses.

Object of the Invention

The basis of the invention is the task to create a method that would provide constant normalized difference of speeds of the working mass and a device to impart motion to the working mass along the set trajectory and that would provide constant tractive force.

The other object of the invention is a device, where the one-way conversion of the rotary motion of the working mass into the forward motion of the structure would be performed due to the interaction of the working mass with a rotor and due to the interaction of the working mass with the structure case, moreover it should be constant and highly efficient, so that it could provide the basis for the new generation carriers.

Summary of the Invention

The posed problem is solved by the fact, that in the method of rotation force exertion by means of the rotary motion conversion into the forward one, to set the working mass in rotary motion, in accordance with the invention there is permanent affection of the rotating working mass to alter the radius of its rotation. This happened due to the fact, that there is constant relative speed of motion between the working mass and the structure elements.

The other posed problem is solved by the fact, that in the device to exert driving force by the alteration of the working mass rotary motion into the forward motion of the whole structure, that is composed of a case, a coaxial device inside to impart motion to the working mass along a special trajectory, a drive and a source of energy. In accordance with the invention, the device to impart motion along a set trajectory to the working mass is executed in the form a conical rotor, on the tapered surface of which there is a helical spiral, and of a conical case, the walls of which are close to the rotor; the device is provided with an additional outer case to enclose the inner conical one, and there are through holes near the base and near the top of the conical case to join the inner space of the conical case to the inner space of the outer case; the inner conical case is rigidly attached inside the fixed outer case, and the conical rotor is installed in the outer case to enable its axial rotation.

Due to the fact, that a device to impart motion to the working mass along the helical spiral with reducing radius of rotation is executed properly, the rotating conical rotor moves the working mass along the set trajectory relative to the fixed conical case. It provides constant relative speed, which is a mandatory requirement of the impulse impartation to the case of the device; that is why the conversion of rotary motion of the working mass into forward motion of the whole system in one direction continues constantly. Moreover, a force of reaction, targeted along the axis of rotation on the conical rotor from the moving working mass, as the reducing radius of the inertial mass rotation radius increases its linear speed, which exceeds the speed of the working elements of the rotor. Thus, the conversion of rotary motion into forward motion of the whole structure results from the interaction of the moving working mass with the conical rotor.

Constant circulation of the working mass, coming out of the holes at the top of the conical case and entering the chamber of the inner conical case through the holes near its base is provided by the natural differential pressure. The rotor rotates in the necessary direction due to the drive, using electrical or other energy.

The working element may expediently be executed in the form of a helical spiral groove on the flank surface of the conical rotor that forms a spiral conical channel with the walls of the conical case.

The working element may also be executed as a set of blades, installed spirally on the flank surface of the conical rotor.

As in this method a constant one-way driving force is a result of the working mass rotation, during the device operation its case is constantly affected by the moment of rotation, equivalent to the quantity of the exerted tractive force. That is why the installation of the suggested power devices on a carrier should be performed in pairs with the opposite direction of the rotor rotation, but in the same direction of the driving force that will make it possible to compensate the moment of rotation imparted to the outer case of the device.

The optimal slope angle of the spiral, conditioned by its pitch, depends on the speed of the working mass rotation in the involved section of the cone; that is why the varied pitch of the spiral may expediently be used to define the working elements location.

Multifilar helix makes it possible to increase the quantity of the working mass, moving along the defined trajectory in the clearance between the conical rotor and the conical case, which can thus increase the output.

Brief Description of Drawings

The invention is illustrated by drawings, where

Fig. 1 shows a device constructed in accordance with the invention

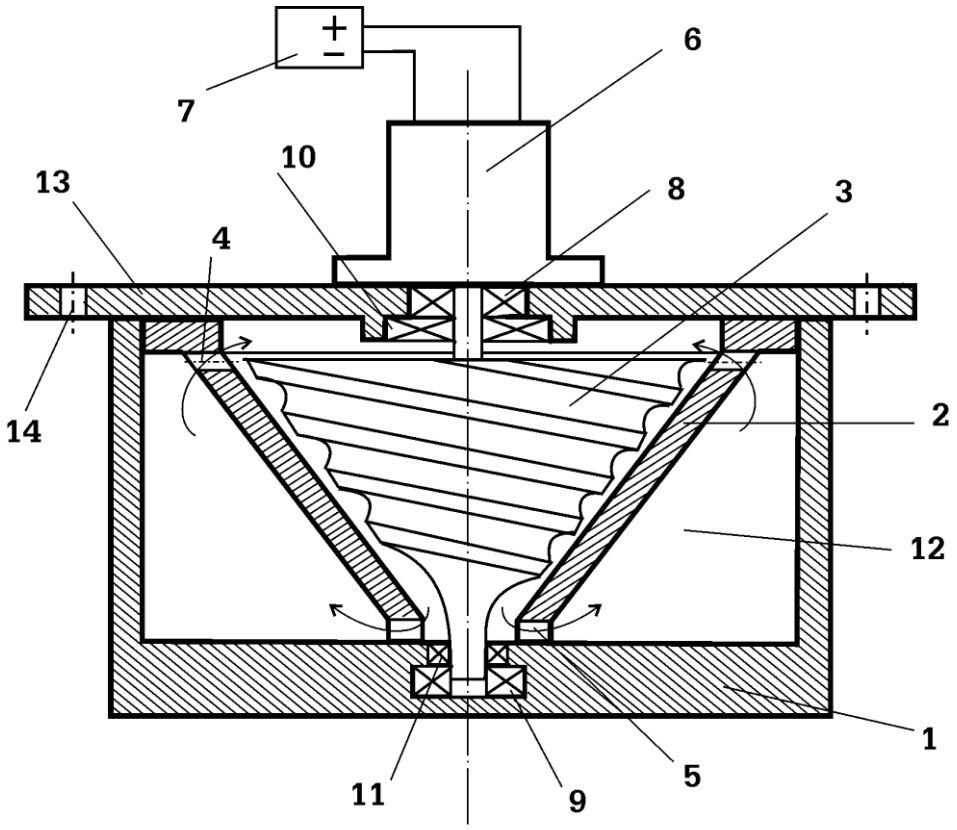

Fig.1

Fig. 2 shows another way of the invention construction, with a helical curve with opposite-directed spirals on the inner surface of the conical case to increase the effectiveness of the curvilinear motion of the working mass into the axial traction force.

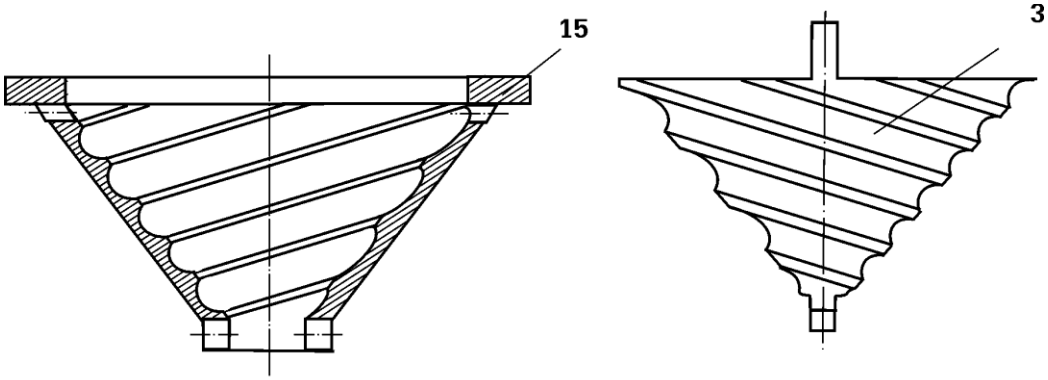

Fig.2 and Fig.3

Fig. 3 depicts a variant of the conical case construction with coordinated spirals

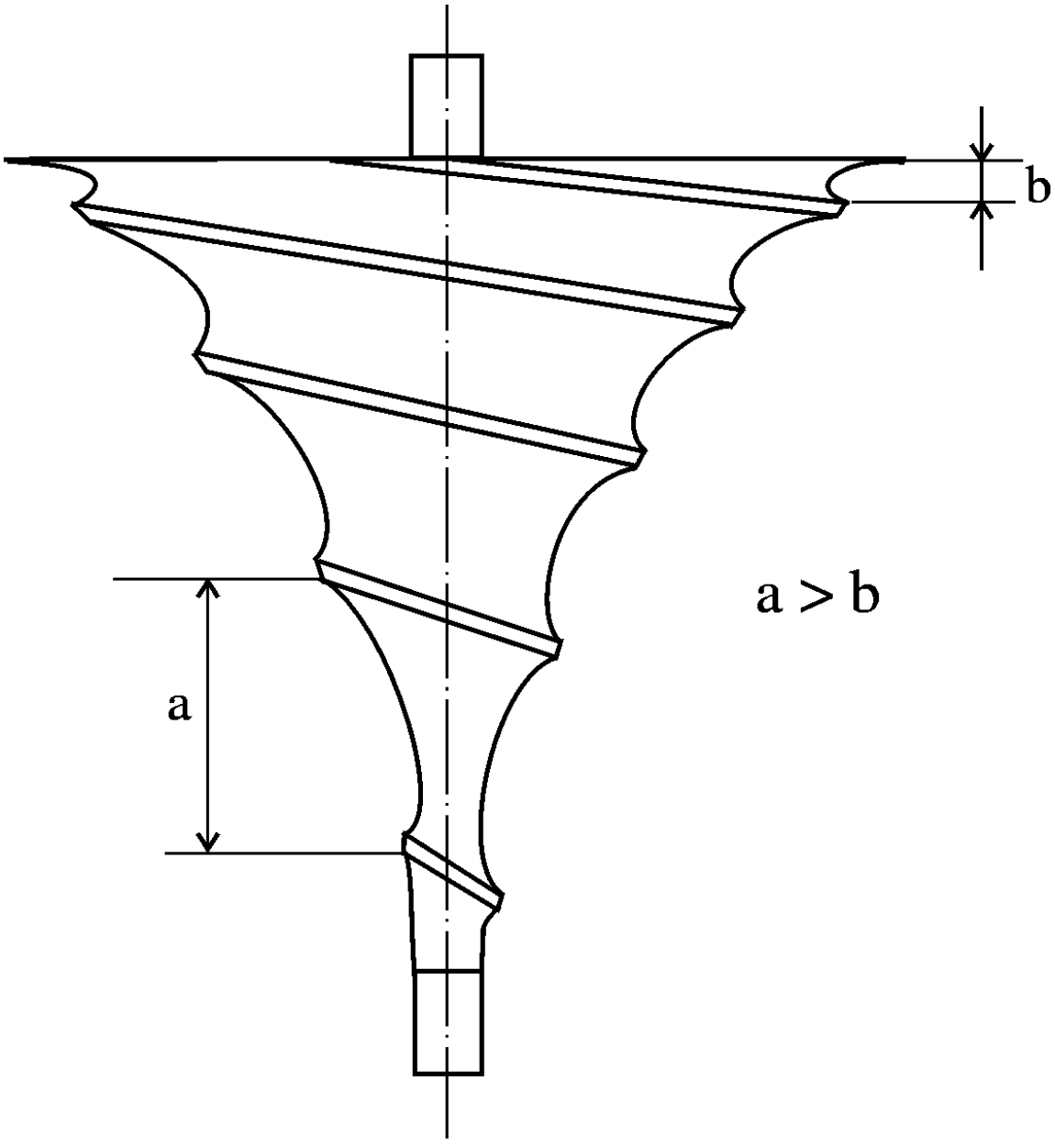

Fig.4

Fig. 4 depicts a variant of the rotor with non-linear alteration of the cone radius and altering pitch that increases from the base of the cone to its top.

Detailed Description

As Fig. 1 shows, the device consists of an outer case 1 with an inner conical case 2 that has a conical rotor 3 inside with inlet and outlet holes 4 and 5 for the liquid circulation. Drive 6 provides the rotor 3 rotation, consuming energy from source 7. Bearings 8 and 9 are guarded against liquid with sealing glands 10 and 11. Liquid 12 fills the whole chamber of the outer case, including the space between the inner conical case and the rotor. The outer case lid 13 has mounting holes 14.

The described construction is meant to use liquid as the working mass. In the case, when gas is used as a working mass, it would be useful to increase the surface of the rotor working elements and the inner conical case. If granular solid material is used, the device operation is characterized by the low speed of rotation and the same effectiveness, but the working elements may expediently be constructed as separate spirally installed blades. Plasma usage demands materials of high heat stability to design the rotor and the case.

The device works in the following way. When drive 6 is turned on, rotor 3 is set in rotary motion. The helical spiral form of the rotor sets the liquid in motion. Centrifugal force presses it against the inner surface of the case, with probable spiral working elements. In this case due to the relative differential speed, the working mass and the case start to interact and it changes the trajectory of the upper layer of the working mass and transfers the equivalent impulse to the case of the device.

If the rotor and the case are conical, the working mass is set in motion and forcedly shifted towards the top of the cone. Still consideration must be given to the fact, that the mass starts its rotation in the base of the cone with a certain linear speed, which is determined by the rotor radius in this section.

Inertial properties of the working mass are manifested in the fact that due to the conservation of momentum with reduced radius of rotation the linear speed of its movement exceeds the linear speed on this radius of the rotor rotation. There appears differential speed of the working mass and the rotor, and the speed of the rotor surface is lower than the speed of the working mass. Thus, the reason of the constant force, exerted on the rotor along the axis of its rotation, are inertial properties of the working mass, which forcedly travels along the spiral trajectory with reducing radius of rotation.

Fig. 2 shows a variant of the conical case 15 with working elements with opposite directions of the spirals as to the rotor.

Fig. 3 shows a variant of the conical case 16 with working elements with coordinate directions of the spirals as to the rotor.

In natural conditions the gas or liquid rotation leads to a vortex in a form of a non-linear expanding spiral, and together with the altered radius of the vortex particles rotation, the spiral pitch alters as well. The optimal form of the rotor is a form close to a natural vortex, Fig. 4. Such structure of the rotor demands a corresponding form of the conical case.

Working elements on the inner surface of the conical case improve the interaction between the liquid mass and the case of the structure.

Statement of the Advantages to Be Gained By the Invention

During the experiments we designed a device, the case and the basic detail of which were made of aluminum. Fig.5 and Fig.6

Fig.5

Fig.6

The rotor diameter at the base is about 80 mm, and in the area of the liquid outlet – about 20 mm. To produce a vortex we used a standard electrical engine with a 12V accumulator. The power consumption was about 50W. The speed of rotation ranged from 30 to 300 rpm due to the changed supply voltage. Water and other liquid substances, density of which exceeds that of water were used as working liquid. The produced force was measured with electronic scales to within 0.1 g. The received results let us draw a positive conclusion about the performance of this method and of its practical application as a mover in various carriers, that needs no base or jet rejection of mass beyond the case of the device.

References

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