Hydroelectric power auto with peripheral torque to the wheels.

Hydroelectric power auto with peripheral torque to the wheels.

Italian patent N. 102016000087373 dated 26/08/2016

ABSTRACT

The current state of the art of means of transport was affected by heat engines, which predominated, for the absence of viable renewable energy with small dimensions. But the invention of the pump with double separate supply until the impeller has allowed the pressurized hydropower invention, with recycling water, which can replace thermal engines. Certainly it is more cumbersome, but immensely cheaper and nonpolluting. From the point of view of the electro-mechanical means of transport that will use the pressurized hydropower, are simplified, eliminating in addition to heat engines the fuel tank, the mufflers and exhaust pipes, the engine cooling system, the transmission shafts, the exchange gears, clutch, differential. The hydroelectric-electronic system, which will be used, does not need of fuels and even of heavy and expensive batteries lithium accumulators with little shipping autonomy, which involve considerable disposal costs and the use of materials in the process of exhaustion. The hydroelectric means of transport will cost less of the existing means of transport for the absence of many of the components mentioned above but also because the motion transmission by electric-electronic means is much more economical than the mechanical, without sacrificing the safety on the road. In fact, the four-wheel drive of the wheels may be of series and all the wheels powered and controlled

individually. Also the control of the differential speed in the curves and the braking system (ABS) may be incorporated in the motors that turn the wheels by transmitting the driving torque to the periphery and not in the center of the wheels as in the existing vehicles. This allows to reduce the power required according to the transmission ratio between the ring gear mounted to the periphery of the wheel rim and the pinion keyed to the shaft of the electric motor that turns the wheel, but also according to the force-transmitting arm, which coincides with the radius of the rim on which the tire wheel is mounted. In the hydroelectric vehicle the reduction in power is not imported for the purpose of energy consumption, since the energy is produced without the outlay of money for the fuels, but to reduce the size of the electro-mechanical equipment, and especially to reduce the volume of the tanks which will be incorporated in the means of transport. By the pumps with the dual separate supply up to the impeller, we can work around the autoclave pressure, without having to restore, by inserting in the 'water recycling circuit water which has produced the energy, consuming a small part of the energy produced by the group turbine – alternator. The drive control of the pump motors and the drive wheels allows managing instant by instant the energy that must be produced based on consumption required by the vehicle.

DESCRIPTION

The world waits anxiously renewable energy, clean and with high yields by the science that soon followed. All have focused on the study of alternative energies such as nuclear, hydrogen transformation into fuel, as solar or wind power, hydroelectric power with the hydraulic jump. But these energies are not applicable on public transport, which produce large urban air pollution, which is the most harmful to the life of men. At present, the problem of global warming has led to an incredible race between automakers to create fully electric cars or hybrid engines, which with high costs

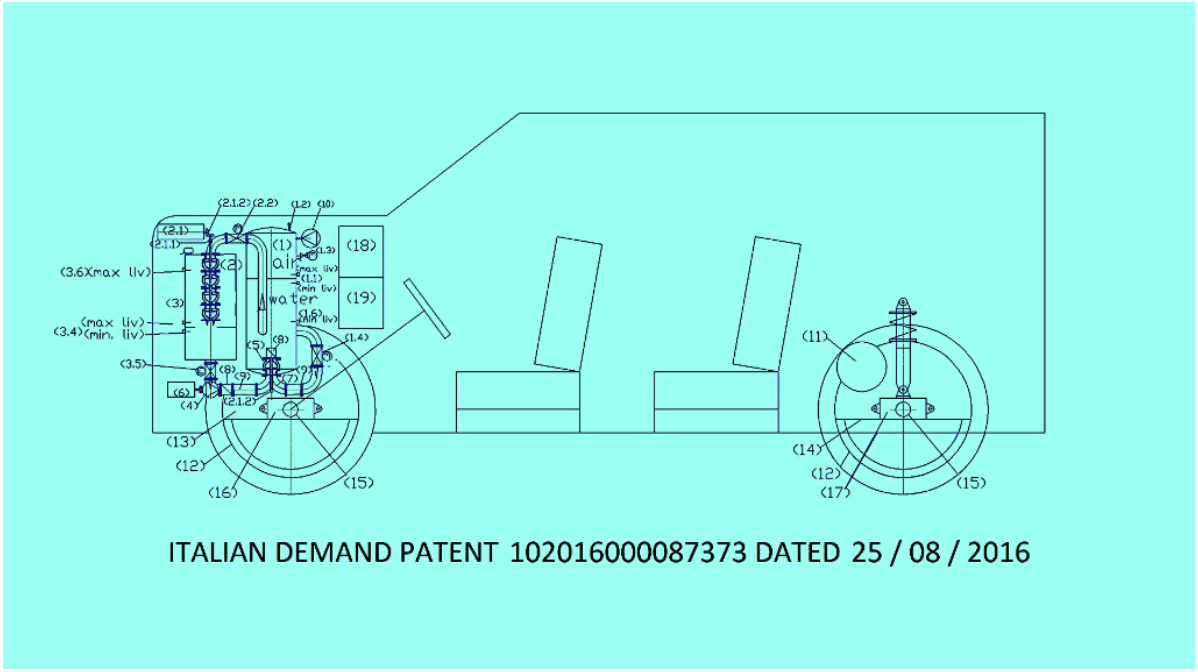
partially approach problems, both environmental and technical. But the means of transport that use batteries merely replace the main engine leaving all the mechanics of the same transmission. So we can not say that are sustainable means to the high cost of the batteries and the cars, but also for environmental charges involving the disposal of used batteries. But the batteries are not even practical, allowing autonomy of a hundred kilometers and long stops for charging. Moreover, the large thermal power plants also serve equally to charge the batteries of the car, although they continue to not be compatible with the environment, not only for air pollution, but also for the heat, which heats the water serving for cooling turbines and condensers. They are not compatible with the environment even large tankers that ply the seas and the big pipelines. Even the biological energy is thermal energy, but the only problem is to solve the reduction of CO2, while the other polluting components continue to exist, continue to exist as the electricity distribution networks involving other energy losses structural and considerable costs, more security problems for the high voltages necessary to transport. In addition, the undergrounding of electricity transmission lines complicates the construction of modern cities with metro lines and auto purifying water and air. All these technical incongruities, energy, environmental, Machiavellian reasoning, may have a justified only if there was an economic advantage to produce thermal energy, nuclear, biological, solar, wind, but this advantage exists only because hydropower with the recycling of ‘water has never been produced, in the fixed and mobile version. It seems that nobody wants to produce it, since no one has invested a euro in this direction. But hydropower with water recycling, even without money and trials it has also grown in the fixed and mobile version, virtually, because, until now, the laws of physics and hydraulics were not used at all possible aspects. Above all, has not been taken into account the position of the surface energy of water within the same basin, the energy of the artificial position produced

from the compressed air in a tank, the internal circulation in a volume of water with a ‘high static pressure, which is not influenced by this pressure, being the incompressible water. It been sufficient to study new hydraulic circuits taking into account these elements to change completely, for the better, the whole industrial plant, civil, environmental, even though the world has not noticed anything, because those who did wrong plant design of the present and past pretend not to understand, including the science World and the large multinationals. To successfully exploit the air and water feature you need to edit simultaneously with equipment and pumps and if you also want to produce energy, include also hydraulic turbine system, which for over one hundred fifty years working independently, exploiting natural kinetic energies. And even before rudimentary turbine with wooden blades, for thousands of years they have allowed grinding grain in the mills. But these solutions have not required a great inventiveness. Hydroelectric car simply shows that the field of hydraulic applications has serious responsibilities against global warming, because he had the solution at hand and has not sought, while the thermodynamic industry has made every effort, but environmental miracles not they can do if they are wrong the basic principles to be exploited to produce sustainable energy and environmentally compatible. Hybrid cars and battery are palliatives. First we will need admit mistakes by all the experts, including environmental and energy policy makers and then will be able to start a new industrial policy, environment, energy and transport.

Brief Description of Drawings

FIG. 1 shows the arrangement of maximum of the hydroelectric plant in the car engine hood, where they are visible in particular the technical devices which have allowed to reduce to a minimum the overall dimensions. In particular way is important for the use of a well pump used as a turbine, feeding it to the opposite direction with respect to the way

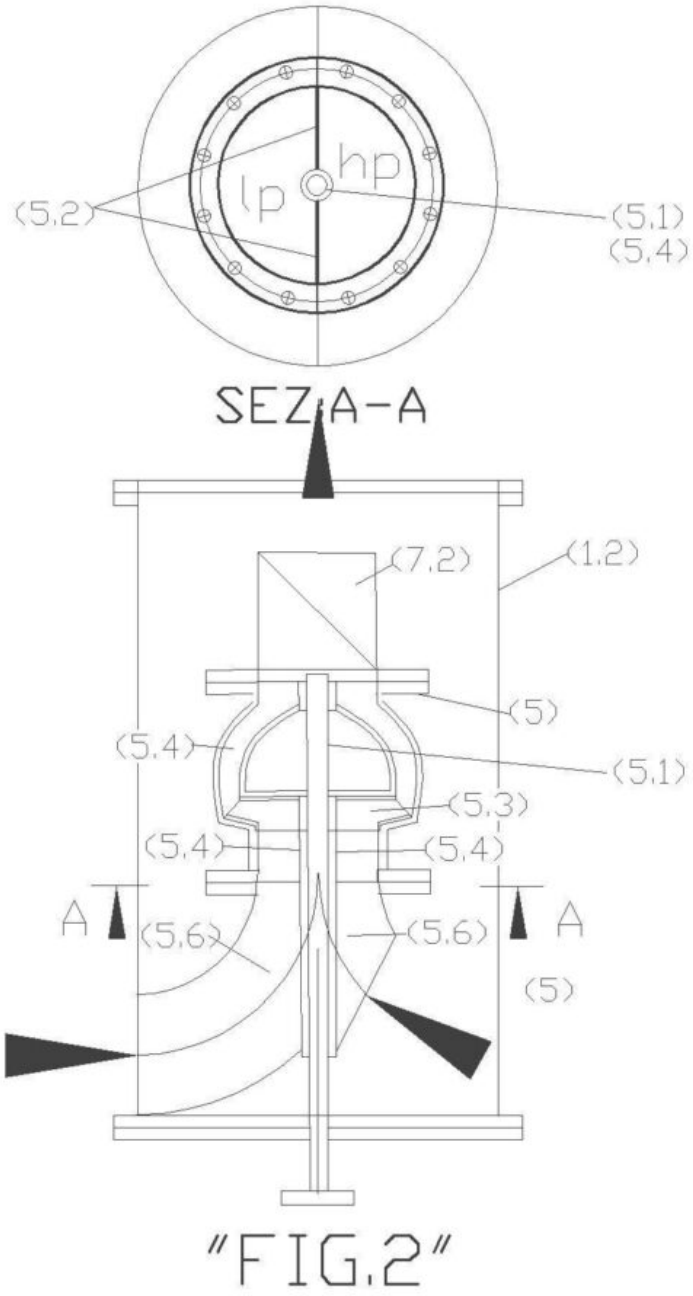
in which it is used the pump (All pumps powered the contrary can be used as turbines), but, in this case, a submersible pump saves much space being inserted directly into the tank where it must discharge the water to be recycled. Another precaution is the arrangement angle of the alternating current generator, arranged above, after the pump shaft having prolonged until coming out through the supply curve by means of a bushing containing a ring of mechanical seal or stuffing box. Even for the entry of water into the pressurized tank is used a pump with a double separate supply obtained from a single-stage pump for the well, which allows it to be installed in the water, coupled at an angle, by means of a diverter conical gears 90 degrees, to an alternating current motor, inferiorly placed, prior extension shaft that runs through the supply double curve by means of a bushing with a mechanical seal or stuffing box. Probably, these solutions will be universalized in all means of transportation that will use the hydro engine, although they will have more space available: trucks, buses, trains, ships and airplanes. Nobody sorry travel without consuming money for fuels and lubricating oils, regardless of pollution.



ITALIAN DEMAND PATENT 102016000087373 DATED 25 / 08 / 2016

FIG. 2 shows a section of the pump with double separate supply

until the impeller which allows energy miracle connecting two different hydraulic systems: One is generous in energy production that uses the energy of the compressed air on water and one thrifty in the phase of recovery of the same water (lp = low pressure), which is inserted directly into the impeller in rotation, of the pressurized water recycling circuit (hp = high pressure) without the opposition affected by the hydrostatic pressure.



"FIG.2"

FIG. 3 schematically shows the mounting section of the shaft (15) which no longer receive motion from the heat engine through the gearbox and differential, but it will be a simple fixed shaft, as the drive takes place through the modified rim, the motor 11, supported by the supports (13 – 14), connected to the axles (16 – 17). It is not necessary to get into other details in which the automakers have very advanced experiences to find the right solutions.

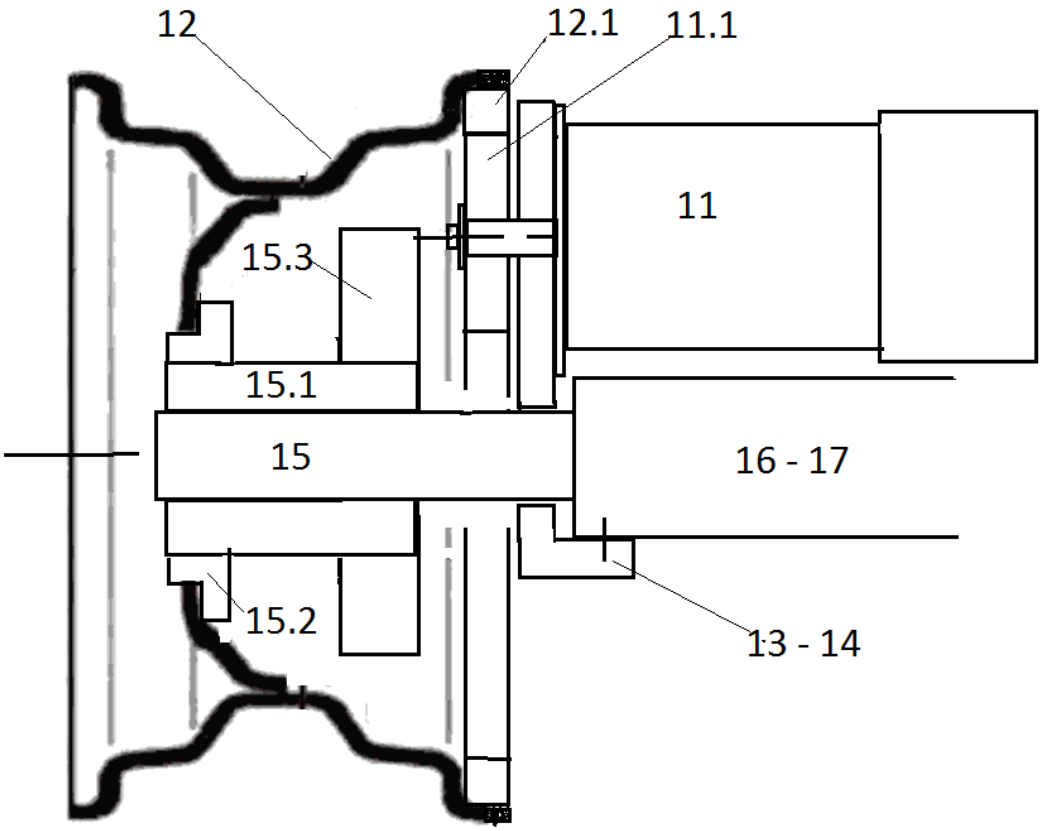


Fig. 3

Legend of FIG.1, 2 ,3 : (1) autoclave pressurized tank; (1.1) level regulator with capacitive probes; (1.2) safety valve; (1.3) manometer with shut-off valve; (1.4) motorized valve flow control with position transmitter; (1.5) pressure or flow transmitter; (1.6) minimum level probe in the start system; (2) pump used as a turbine (pat); (2.1) alternating current generator; (2.1.1) bushing with sealing ring; (2.1.2) angle diverter with conical gears; (2.1.3) transmission shaft; (2.1.4) transmission shaft protection tube (2.1.5) double curve with septa crossed separators in low pressure (LP) and high pressure (hp); (2.1.6) septa separators of flow; (2.1.7) closed type; (2.1.8) Diffuser of the pump; (2.2) motorized

valve to supply turbine with flow adjustment; (3) water transit tank at atmospheric pressure and containment pat; (3.1) motorized valve to feed pressurized water network; (3.2) motorized valve bypass supply at low pressure; (3.3) air valves; (3.4) Water level control with capacitance probes; (3.5) motorized valve for water supply at low pressure; (3.6) maximum level probe in the start system; (4) electric pump to supply in low pressure (5) electric pump with double separate supply until the impeller; (6) pump drive motor, with variable speed, controlled by an inverter; (7) double curve with septa crossed separators in low pressure (LP) and high pressure (hp); (7.1) septa to flow separators; (8) check valve. (9) flow diverter stub pipe; (10) electrocompressor; (11) self braking engine with variable revs (11.1) sprocket gears; (12) wheel rim; 12.1 ring gear; (13) motorization support of front wheel; (14) motorization support of rear wheel; (15) stationary shaft; (15.1) bearing; (15.2) wheel rim mounting flange; 15.3 brake disc; (16) front Axle; (17) rear axle; (18) electric command and control panel; (19) heat pump for summer and winter air conditioning.

In the world of environment and energy it is also needed strategic inventions that cut across all sectors as the recent invention of the pumps with double separate supply until the impeller. To understand the functioning of how this type of pump, it can be observed FIG. 2, and imagine the center of the impeller supplied by four sectors separated by 90 degrees cruise. Two are supplied in low pressure and two high pressure, possibly arranged diagonally to balance the hydraulic thrust on the bearings. Furthermore, observing the FIG.1, it is necessary to make a distinction between the static and dynamic pressure of system. The static pressure is the pressure supplied by the compressed air cushion and with the valve (1.4) open, spreads on the right side of the pump with double separate supply also entering into the impeller. The dynamic pressure, or kinetic energy, is that which circulates the water inside the tubes and autoclave. In open

circuit on the left side of the autoclave. To circulate the water is sufficient to open the valve (2.2) and the air pressure circulates the water in the turbine, but the air pressure decreases as it expands the volume of air and the water comes out from the circuit. While to circulate the water on the right side of the pump with the double separate supply up to the impeller, it is necessary to open the valve (1.4) and to move the pump since the static pressure already fills the entire circuit, also coming into the impeller, but without the movement of the pump the water is not circulating for obvious reasons. However, it is sufficient to provide the pump the prevalence of a few cm of water column to overcome the pressure loss of the check valve, since the static pressure does not oppose the kinetic energy developed internally to the stored volume of water. So, we can have a static pressure of 12 bar and a dynamic pressure of 0.25 bar. But the movement on the right side (looking at FIG. 1) does not produce energy, being only an internal recycling in the stored water volume. To produce energy we must use the circuit on the left side of the autoclave passing through the pump used as a turbine (2) and insert with a low energy cost the water free of static pressure in the autoclave tank, that the current state of the art requires a pump with a prevalence that wins the static pressure and the pressure drop, then a higher prevalence to 12.5 bar. This is the reason why hydropower with water recycling has never been produced. With the pump with double separate supply until to the impeller we can achieve this application with a very low energy cost that seems impossible, because coming from the suction side of the pump that is already full of water statically pressurized from the autoclave, we get around the opposition of pressure hydrostatic, as if it were an internal circulation to the pressurized volume of water. In fact, the suction pipe of the pump, which comes from the left side (open) and from the right side (closed) is divided into four fixed and separate sectors (as seen from FIG.2), therefore, when the impeller rotates, advances towards the autoclave the water present in the

impeller and produces in each quarter of the sector of the supply pipe a depression which favors the entry of water into the impeller both from right side, both from the left sideAs soon as the inlet water is involved by centrifugal acceleration towards the periphery, produced by the fins of the impeller which is proportional to the square of the angular velocity, and in the radius of rotation, according to coefficients that depend on the type of impeller But the important characteristic of the pump with the dual separate power supply is one that the rotation forces the impeller to receive in succession in the same quarter of the impeller, the water sucked from the four separate sectors. Not simultaneously, as is the case with pumps that have only one power supply. Therefore, the water of open circuit (no static pressure) and the water of the closed circuit (with the static pressure of the autoclave), alternates in the same location and with the same direction (toward the impeller exit). This functioning implies that the flow rates are added together, while the total pressure (static plus dynamic) spreads in the entire outlet section, according to the principle of Pascal. Obviously, since the static pressure is only transmitted from the right side of the system, for not having drops in pressure in the pump with the dual separate supply, the passage sections must be dimensioned, for the transmission of the entire flow rate and pressure. This simple modification of the pump allows us to retrieved with costs infinitesimal the water that has produced energy in the pump used as a hydraulic turbine which is located on the left side of the system and reinsert it in the pressurized water recycling of the tank circuit, without that occurs the pressure drop due to the expansion of the air cushion, which occurs in normal autoclaves, whose restoring, would require energy both from the pumps that the compressors. In fact, the autoclave system was not born to produce energy, but to limit the number of starts of the pump motors, by providing for a few minutes to the hydraulic system, which consumes water, the volume of water stored by means of the expansion of the cushion of air.

It ‘obvious, that the same system can be used to produce energy if the water exits the autoclave circuit (to produce energy) and go back simultaneously by another input, without changing the internal volume. Obviously, the return of water i pressurized autoclave must not be with the force of a multistage pump, which consumes more energy than it produced, giving reason to skeptics who ironically call “perpetual motion” hydropower with water recycling. Skeptics have been right only because it lacked the pump invention with double separate supply until to the impeller. In fact, if the separation of the flow does not reach inside the impeller and if this is not rotating, the system does not work, relying on the dynamic pressure to bypass the static pressure. In the hydropower system of the car the valve (2.2), which feeds the pump used as a turbine, must be strictly closed when the car is not in operation, otherwise they are not the conditions for starting the system. In the car hydroelectric plant of FIG.1, we expand the air cushion only in the starting phase of the hydraulic motor, to reduce battery costs for starting and possible three-phase UPS group. During normal operation, the water coming out from the autoclave must be perfectly in a quantity equal to that which enters into the left mouth of the pump with the double feeding, without stopping in the tank (3) and without accelerating the flow, while the mouth the right is used only to pressurized water recycling from the air cushion (the recycling pump works with a very low prevalence merely to recycle the water in the same volume without lift or win the compressed air cushion pressure). Today these adjustments are possible by establishing a priori limit the oscillation of the water level in the two side by side tanks, either by means of adjustments of the valves, both of the speed of the pump motors, while the decrease of the air pressure is regulated by a pressure switch that drives the compressor at the minimum variation. Thus, at rated operating conditions, not happening the variation of volume of water in the pressurized tank, do not happen the expansion of the air cushion, therefore, no power is consumed to compress the air

cushion. However, the water that comes out from the autoclave also receives the pressure required to produce energy in the turbine. Obviously, the energy absorption can not be eliminated completely, but it consumes only a very small percentage of the current energies that absorb the hydraulic systems that need to raise the water or compress the air cushions. Since the drive motors of the variable speed pumps, this system can produce the energy that serves to a means of carrying a full load, no load, in the various phases of operation, simply by pressing the acceleration pedal of the vehicle. In fact, the control unit (18) distributes the flow of energy to the electric circuit of the means of transport, which, in the case of a car, is mainly composed, by two or four AC motors (11) three-phase or single phase, by the heat pump for the summer and winter conditioning and auxiliary circuits in low-voltage direct current, which feeds, in particular the valve that intercepts the turbine (2.2), the starter battery, little larger than the current batteries.

Fig. 3 shows in a very schematic way as is the transmission of motion to the drive wheels in hydroelectric power car, where the torque is applied to the periphery of each rim, by means of a transmission cylindrical teeth between a ring (12.1) and a spool (11.1). The fixed part of the transmission will be the new support of support of the front wheel motor drive (13) and rear (14 in the case of four-wheel drive). This support is in the form of half disk, also acts as a protective casing of the gear transmission and ensures the same oscillation of the current wheels, adjusting the convergence, the connection with the steering system and suspension, the flange on which port is mounted the electric motor (11) which carries the sprocket (11.1), and is crossed from the shaft (15) with the rotation of the bearing which carries the brake disk, the flange on which is mounted the rim (12) which is supported cantilevered from ‘front axle (16), equipped with an articulated frame to allow for minimum turning radii, or rigid rear from the axle.

This change of the motion transmission system allows to eliminate the gearbox with relative differential, since the reduction of revolutions of the wheel relative to the engine will take place by means of the transmission ratio between the ring gear, integral with the wheel rim, and the braking three-phase asynchronous motor car that makes the spool. But it is also advisable increase the diameter of the wheels, as it would reduce even further the footprint and cost of the hydroelectric system. By way of example, with the pitch diameter of about 600 mm and that of the crown of 200 mm spool we have a reduction ratio of revolutions of the engine equal to 3. But what's even more important is the fact that by applying the driving force on the pitch diameter of the wheel rim and not on the axis of the wheel (as is currently), multiply the torque to the transmission arm, therefore, we reduce to 1/3 the force required for the motion transmission, and whereas the rubberized part of full load wheel is 10 cm high where applies the resisting torque, also improve the acceleration of the means of transport with a low number of revolutions and torque.

If we start from a two-pole electric motor that performs 2840 revolutions per minute, the maximum speed of the wheel device will be 946.6 rpm, with the outer diameter of tyred wheels 0.8 m (2.512 m) circumference, we have a velocity hourly maximum of 2,378 m / min, equivalent to 142.6 km / h. With the present system, which has the transmission gears connected to the central motor of the transmitted power value is always the same for any gear, both on the engine to the drive wheels; this is due to the fact that the power is given by the pair by the number of revolutions and the torque resistant and are applied on the same axis of rotation, for which the torque increases when the number of revolutions decreases and conversely. With the electric transmission, adjusted with inverter, the transmitted power is not the same but gradual, also, the application of the driving force of a rotating arm which approaches the resistant arm, which is applied on the

tire tread, globally reduces the ‘total absorption, both at minimum both at maximum rpm.

Making an approximate calculation of the forces opposing the movement of wheel loaders, for a vehicle fully loaded weighs 2000 kg can take the following values:

Rolling resistance on asphalt (20 kg / 1000 kg) = 40 kg;

Aerodynamic resistance (Eiffel formula) K * S * V2, where k = 0.0054 for v = 142 km / h S = 2 m2 = 218 kg

inertia resistance for the supposed acceleration of 1 m / s2 (1000 * 1/2 * t * g ka), where ka = 1.2 = 244 kg

Considering the total resistance to the motion of calculated kg 502 (40 + 218 + 244), calculate the total power necessary to the translation P = F * v (m / s) / 1000 in kw = 39,44 * 502/1000 = 19, 8 KW.

This calculation is consistent with the powers of electric cars with lithium batteries that car manufacturers are putting on the market. There is a noticeable difference with the corresponding internal combustion engine of the same model of car, the power of which is about four or five times the battery power. This difference, in part is due to the fact that for reasons of cost will limit the performance of the electric car, but is mainly due to the low efficiency of heat engines, which stands at approximately 35% of the lower calorific value of the fuel.

Therefore, it can be said that thermal engines are practical to make but are polluting and with low yields. While electric cars, having little service autonomy, are impractical and expensive. Instead, we are at year zero for hydroelectric car that could have the best returns from an environmental and energy point of view, because, as above written, do not require fuels and installed electrical power can be significantly reduced by applying torque to the the periphery

of the wheel rims and increasing the diameter, decreasing the energy equipment cost and size of the hydroelectric plant.

Suppose to realize a small plant with pressurized autoclave which produces energy for the car by the weight of 2000 kg, above hypothesized by means of an alternating current generator (2.1) coupled to a pump used as a turbine (pat), that is able to produce the energy calculated above. Which, as written above, applied to the periphery of the wheel rims with a gear transmission and electric motors, it is reduced to 1/3 of the calculated one (19.8 / 3) = 6.6 Kw.

Assuming to make a four-wheel drive vehicle, we will apply to each wheel brake three-phase asynchronous motor car two-pole, 2.2 kW with a functioning DC brake. The brake is supplied by a rectifier located inside the terminal box. The rectifier is provided with protective devices against surges. The cooling fan is placed in the rear of the engine. The salient features of the self-braking motors with dc brake, are extremely quiet during braking, the progressivity when starting and stopping the engine. This allows to control the wheels on each occasion by means of the motors and to prevent overheating of the brake discs, which intervene only in emergency cases. The self-braking motors are particularly suitable to be supplied by an inverter, in our case are provided with a double shaft projection and with the speed detection device, of the angular position (encoder), to integrate the functions necessary to the system ABS braking and the differential speed in the curves, which today are made, certainly with higher costs, separately, on rotating wheels and brake. In fact, the small drive motors from 2.2 kw braked with a braking torque of about 20 Nm certainly are not able to restrain the moving mass of a means of transport by T 2, therefore, the present braking system must be preserved, but the small slowdowns and small braking can be managed by these engines, which allow gradual accelerations and decelerations. Also being connected directly to the rotation of each wheel of the vehicle, the ABS control

electronics can be transferred in the same, as well as the control of the speed of the wheels in the curves. In fact, having electronic control sensors scattered mechanical parts is not very functional. And ‘certainly better to place them in electric motors, which can be easily replaced and overhauled.

The protection of coils can be pushed up to the immersion (IP67) resistance depending on the use intended for the vehicle. L ‘hydroelectric plant which will be combined with this means of transport will produce about 10 Kw / h for more safety margins in performance. Then, an installed power less than half of an electric car, lower costs, and a range of endless path. In addition, the car becomes an incredible tool for work and leisure also becoming mobile generator.

To realize the hydroelectric plant, the choices can be many, but let’s take advantage of a pressurized air cushion of 120 m of water column and an electric pump used as a turbine with a capacity of 12.5 L / s. Assuming the yield is 0.70, applying the formula Pu = η * Q * Hu / 102, we have an energy output of 10.29 kW (0.70 * 12.5 * 120/102).

Assigning to the pump with double separate supply a prevalence of 1.0 m and a 0.6 yield, the power absorbed by the same, which leads a double flow of that which passes into the turbine, calculated by the formula 1 * 25/102 * 0, 6 = 0.40 kW. While the additional circulation pump (3.6), with a flow rate equal to half, suppository with the same yield and prevalence absorbs half of the energy calculated for the double feed pump (0,20 Kw). In this case the relationship between energy expenditure and yield is 17.15 (10.29 / 0.60).

In fact, the load losses in the valves, in the turbine, the special pieces and losses at the outlet, are all absorbed by the dynamic pressures that develop in the pipes that feed the pump under a positive hydrostatic pressure, from both sides, while in discharge not we appreciable losses of load, not

exceeding the water level (which is incompressible). No wonder with this result, whereas compressed gases are accumulators of more powerful energy, flexible and cost of electrical energy storage. One can easily understand that with the help of the compressed air cushion and the small power requested by the valves motors and pumps is very simple to start the system with no starter motor. But the departure will be a little slower, having to carry out more operations before starting an energy production system. But this occurs only at the first start, then there is no need to stop the hydropower engine every small station, no consuming fuel and no producing pollution. If we leave the car in motion only increase the hours of the pumps, motors, turbines and alternators and mechanical wear. As written above, in the hydroelectric engine start-up will take place by means of the expansion of the air cushion, but if the volume of water that can accumulate is not sufficient to completely overcome the departure to alternator scheme, the system is integrated with a group of three-phase UPS (UPS) with battery, rectifier, alternator, loaded by the energy produced during exercise. In fact, during the starting phase, the system control circuit, is an exception to the rule and allows the expansion of the air cushion, until to a minimum level (1.6) by using the accumulated water between the two levels to start the rotation the turbine gradually, as the valve (2.2) with a DC motor, opens. When the water reaches the minimum level (1.6), calculated so that the water does not completely fill the tank (3), controlled by the maximum level (3.6), also open the valves (1.4 and 3.5) and make low the two pumps (4 and 5). When the plant is operational, gradually, the control system brings the water level in the pressurized tank to the nominal position (1.1), varying the pump speed and the position of the valves, to allow to easily carry out a new restart of vehicle.

In the phase of steady state operation, the air cushion, after recovery at the higher level, controlled by the regulator (1.1), does not expand, thus all the water returns into the

autoclave through the two inlets of the pump with double separate supply. In fact, the double separate supply until to the impeller, allows to have very similar flow rates by means of the adjustment of the valves (1.4, 2.2, 3.5) and the revolutions of the pump (4), despite the difference in static pressure existing on supply. Therefore, we can estimate that 50% of the total flow of the pump with the dual separate supply (5) passes from the right side (that is a simple recycling) and 50% from the left side (through the pump used as a turbine), producing power . In fact, the turbine discharge the water in the tank (3), from which, the low-pressure pump (4), the check valve (8), the stub flow diverter (9), the double curve with separator baffles, feeding the left side of the pump with double separate power supply (5). The energy expenditure provided to the pump (4), estimated hereinafter, is not that which would be required if we had used the usual hydraulic and electric circuits and to return the water into the autoclave, but only the one to reach the ‘ water in the pump impeller with dual supply. Who will bring the water inside the autoclave is the circuit on the right side of the pump, where the static pressures on the suction and delivery, are in balance and thus the direction of the water flow depends only on the rotation of the impeller. Consequently, also the water that comes from the left side fits into this flow, not only because the impeller is common, but also because the partitions (2.1.6) arriving lap the profile of the impeller, act as anti-return valve Furthermore, the rotation does get into every fourth of the cruise sector shown in FIG. 2 in water succession in high and low pressure (hp + lp) that having the same direction are added together, they do not contrast, also in accordance with Pascal’s law which states that the pressure expands in all directions (when it is static). When there is a unidirectional flow, conditioned by the rotation of a pump, the walls of the pipes and check valves the dynamic pressure is forced to expand in the direction of flow.

Fig. 1 schematically illustrates a realistic arrangement of this system on a car to the current state by retrieving from the market the necessary elements for the handicraft construction of the hydroelectric motor and the relative transformation of the motion transmission to the driving wheels. The hydroelectric plant is supported by a fixed structure (not visible from the drawing) Autonomous, connected to the car body. Indeed, in contrast to the heat engine, the hydraulic motor must not transmit mechanical stresses. The mechanical forces of the transmission are concentrated only near to the drive wheels and axle connected to the body by means of shock absorbers and antivibration supports.

Obviously, producing specifically for the transport sector pumps, turbines, valves in a short time, you will have less cumbersome solutions. The margins for improvement are very many, using higher quality materials, operating pressures, selected on a case by case.

Suppose we create a small hydroelectric engine which produces energy by means of one AC generators (2.1) coupled to one pumps used as turbines (pat), exploiting the useful height Hu = 400 m and a dual feed pump DN 65 with flow rate 7.5 L / s. Assuming the turbine efficiency is 0.6, applying the formula Pu = η * 1000 * Q * Hu / 102, we have an energy output of 17,6 kW (0.6 * 1000 * 0.0075 * 40/102). Assigning to the pump a prevalence of 1,0 m and a yield 0,6, the power absorbed by the same, which leads a double flow of that which passes into the turbine, calculated by the formula 1,0 * 1000 * 0.015 / 102 * 0, 6 = 0.,244 KW. While the additional circulation pump (3.4), with a flow rate equal to half, suppository with the same yield and prevalence absorbs half of the energy calculated for the double feed pump (0.122 kW). In this case the ratio between the energy expenditure and yield is 48,08 (17,6 / 0, 366).

If the relationship between energy expenditure and yield divide it by the average efficiency of thermal energy to have

the relationship of convenience between the compressed hydropower and thermal energy that equals 137,39 (48,08 / 0, 35). Excluding the cost of fuel, the greater mechanical complexity, the filtration of the flue gases, etc.

On the other hand, the large series production which involves the transport sector, has already done wonders struck a measure of quality of components, also investigated as a function of the very little space available in a motor hood.

The only problems that the industry has been unable to resolve were the CO2 zeroing, the removal of fine particles, and the expenses that the fuels involved. The hydroelectric engine these very serious unsolvable problems for heat engines solved them before birth. As written above, even if it seems impossible, this system produces energy without consuming water that recirculates between the two tanks. Instead, it consumes a small amount of compressed air, which solubilized in the water of the autoclave, is released into the atmosphere when the water is vented to atmospheric pressure in the tank (3), but this phenomenon is quantifiable in milligrams per liter of gas water (nitrogen, oxygen, CO2) according to Dalton's law of which is provided below the main formulas (extracted from the scientific literature) and personal considerations that explain the concepts, without considering the merits of the calculations:

In fact, in a mixture of ideal gases contained in a volume V and the temperature T, the molecules of each gas molecules behave independently from the other gases; as a consequence of this is that the pressure exerted by the gaseous mixture on the walls of the container and on the water surface is given by: where, R is a constant equal to 0.0821; , … represent the number of moles of each component of the mixture. This law is valid under the conditions by which it is valid the ideal gas law is approximated at moderate pressures, but becomes more and more accurate as the pressure is lowered. By defining the molar fraction as the ratio between the number of

moles of the ith component and the number Total of moles present: It is obtained that in a mixture of ideal gases, the partial pressure of each component is given by the total pressure multiplied by the mole fraction of that component: .

In essence, for each gas present in the air is possible to calculate what percentage is solubilized in water at the working pressure, but for practical purposes, the energy that will spend to compress the air will be a small expense, since the air compressed, not ever coming out from the volume of the tank (1) has only small pressure fluctuations, and once it reached the saturation point not dissolves more air. One that is consumed is due to the lower water solubilisation of the gas, at atmospheric pressure. In fact, when the water passes through the tank (3), provided with air vents, releases a small portion of air, which becomes insoluble to the atmospheric pressure, which comes through the vent (3.3). But, obviously, the transit times in this tank are very narrow and the complete air expulsion process can not occur, because, immediately falls into the water tank (1) where the gas can not escape from the surface of ‘water, returning again to the maximum solubilization conditions.

Obviously, to maintain constant water levels of the two tanks is required a computerized management of the degree of opening of the motorized valves (1.4 – 2.2 – 3.5), of which, at least the one that feeds the turbine must be powered at 24 volts DC, having also be operated in the initial system start phase, when the plant does not produce any energy.

The heart of the hydroelectric vehicle is the pump with the double separate supply until to the impeller (5) shown in FIG. 2, without which it would not be possible to circumvent the pressure of the autoclave (1). But it is also important to the way in which it feeds the pump that has to start from a certain distance from the pump, so that in the inlet section of the pump have four separate streams of which two high

pressure (hp) and two low-pressure (lp) , possibly arranged diagonally. In order that this separation of the flows can take place it is necessary to start from the flow diverting (9) logs since the double curve with separator baffles (7), must already receive the channeled flow in the correct position, so that it can cross them, feeding the four internal areas to the impeller in the correct way. Then, the half-curves of the particular (7) using only half of the passage section, already arranged diagonally, that flow in only one input section of the pump already divided into four sectors without flow interruption up to the fins of the impeller, which in this the application will be closed. In the plant proposed the head of the pump to be assigned to the pump with double separate supply, serves to overcome the resistance of the check valve (8) and to to include, together with the water recycled, all the water that comes out of the open circuit (which passes through the turbine) back into the reservoir (1). Therefore the pump with double separate supply (5) carry out five functions:

1. permit the water low pressure of the left side, thrust from the pump (4), to enter in the impeller of the dual separate supply pump until the impeller (5);

2. permit the circulation water in the high static pressure on the right side which do not circulate without the rotation of the impeller, since the pressure upstream and downstream of the pump it would not be in static equilibrium;

3. permit the sum of the two flow separated in the rotating impeller (which do not come together, but succeeded one another in each quarter of the input section for each revolution the impeller);

4. permit the expansion of the total pressure coming from the right side in the pump body according to the principle of Pascal (Although the static pressure is in equilibrium, the dynamic produced by the pump with the dual separate supply,

allows the circulation of water within the volume of water accumulated with a small head of the pump, since the pump delivery and the suction coincide at least on one of the two suction mouths. Therefore, the dynamic pressure produced by the pump is added to that static and expands in the flow direction, pushing also the water coming from the left side of the pump with separate supply, which alone would not have the force to enter and to cross the autoclave.

5. permit to overcome the pressure loss of the check valve (8) with the head of the pump that depends on the type of impeller and pump body used.

If these five operations take place, as written above, it does not vary the volume of water inside the pressurized tank. Therefore, we should not restore the pressure of the air cushion, and being the shortest paths, we have no appreciable fixed pressure drop, apart from the ones we produce spontaneously for adjusting the flow rate and levels through the choking of the valves during start-up and of slow speed and torque. None of these functions requires a precise load loss, apart from the check valve (8), which depends on the speed of the water and at the maximum can be up to 0.5 m, therefore in the indicative calculation of the absorbed power of the pumps (4 and 5) during normal service has been provided for the prevalence of 1 m water column, estimating an average absorption, respectively of 0,20 and 0,40 kw, that is not the installed power, obviously superior, having the pumps variable speed also face major and minor absorption conditions. However, the value is indicative of the fact that with a small energy consumed by the plant, you can develop and consume energy much higher than using different hydraulic regimes and the energy storage unit which is the air cushion. This system is not covered under any theory of scientists as Euler, Bernoulli, Newton, Stokes, Leibniz, Heisenberg, Carnot, Fick, Hamilton, who in so many have legislated laws on energy conservation refers to isolated systems, mechanical,

hydraulic, thermal, chemical, physical.

It can be said that the hydro engine is a practical application that respects these principles, but at the same time it exceeds the limits creating an open system that transfers energy from one system to another, without arriving at the mass energies much more powerful, but difficult to control by man, begun, starting from the Einstein studies.

Industrial applicability. These optimistic technical considerations on the production of energy that some call “produced out of nothing”,are not hopes but certainties, upheld by the same construction technique of hydraulic pumps, in particular, from the multi-stage, with closed impeller, which are used in this application, both with the function of turbine, both with the pump function with the dual separate supply until to the impeller. In fact, the technique of construction of such pumps and machining precision, allow to get to construct pumps with a prevalence of up to hundred bars. We do not need to get to these heads, but this shows, what has been stated in this description, that is, that the rotation the impeller, performs the anti-return function from the left side of the pump with the double separate supply (FIG.1), fed with the lower static pressure. In fact, in the current multistage pumps, you may not reach the pressures that are achieved, if the rotating impeller and the machining accuracy would not be able to perform a powerful anti-return function, since the losses of water through the yokes of coupling between the stationary and rotating parts, would prevent the pressure increase from one stage to another. Therefore, implicitly, we already have the confirmation of successful with very low costs to recover the water and reinsert it into the pressurized tank, following the way of the second mouth of separate suction until to the impeller, while the other mouth recycle with very low manometric head water equipped with high static pressure, using the same impeller. For the above, it can be stated that does not exist

in the world an application longer valid from the industrial and economic point of view. In addition, we need to do some simple considerations on returns between the current thermal-mechanical-electronic system applied to mobile transport and the hydraulic-electrical-mechanical-electronic which aims to realize the transport of the future. worst performance. Furthermore, from the economic point of view, a transmission of electrical energy is much cheaper than a mechanical transmission, but other economies are made on the transmission of torque, that could be brought to the periphery of the drive wheels, can lead to lower installed power of 80% compared to thermal power, as energy calculations above.

So, all the economies achievable with the mechanical simplification and the torque transmission device, at the end, lead not only to lower the costs, but also to reduce the main defect of the hydroelectric solution, that is the dimensions of the plant, especially of reservoirs serving for water and compressed air containment.

As it is shown in FIG.1 showing a car that might look like an SUV (Sport Utility Vehicle). Having to settle in the current hood hydroelectric plant, the current state of the equipment needed for a hydro-electric engine does not allow you to use cars with smaller spaces. In the future SUV and other land transport, in addition to the diesel tank and the relative power supply circuit, it also deletes the exhaust mufflers, the gearbox and differential. All the wheels can become independent driving and the wide and linear speed adjustment. The autoclave plant weight, in large part, is compensated by the mechanical parts eliminated. In cases of accidents there is the danger of the outbreak of the fuel tank. Therefore, one could say that, in addition to benefits, environmental, economic, security also would benefit.

What has allowed to reduce the size of the system and to add it in the hood of a car it has been the idea of reducing the power required by means of the traction device applied to

wheel rims that have been added to that of using the submerged pumps as turbines and pumps with double separate supply, also submersible, which can be inserted in the volume of water stored at atmospheric and pressurized. Also it is very well served the idea of coupling the pumps and the turbines by diverters with angular bevel gear, to reduce the height of the plants. Without such solutions it would not have been possible to present this patent application, unless the plant had not occupied a large of the passenger compartment.

For the moment, whereas there are not yet on the market the main elements necessary to produce this type of transportation, with Fig. 1 proves that even with the current technology, not specifically designed, hydropower car is not a utopia, but a more concrete, practical and economic, of the current cars on the road and those that the automotive industry is going to market because the main problem of the car and transport in general, was and is the energy source, which must be clean and sustainable economy.

Many other measures that will develop the automakers will allow further reduce the size of the hydroelectric plants that will replace the thermal power, and therefore, make the car hydropower even more acceptable from the point of view of aesthetics.

Before the whole world basasse its fossil energy development was necessary to ensure that there were no better solutions. Today you need to find the courage to change, including by the automakers. Do not pretend that this invention does not exist, as is happening on the part of energy producers and by water, public and private operators, who do not admit mistakes, are silent on the fixed versions, non-pressurized, hydraulic applications using the pumps with the dual separate supply until to the impeller, also to produce energy during the phase of lifting of the water, is to distribute, both to defend territories from high waters, both for desalinizzarle, both to cleanse them. Too many important people pretend to want

progress cleaning up the environment and sustainable economy, instead works against. it has not been realized nor funded any project described on http://www.spawhe.eu website because Spawhe is the website of a pensioner, without political, economic, and proposes comprehensive solutions that cut across the lobby mono disciplinary, scientific and technological, that do not cooperate with each other, but work together to hide the transverse solutions to leave things as they are. But as shown by this patent application also a car can become a global and sustainable plant, transversely choosing the solutions needed. As Frederick Taylor said that could be called the father of modern industry “there are many ways to produce an object, but only one is the best” This concept should be extended especially to the choice of cross-cutting strategic inventions, neglected by the advent of the industrial age.

Luigi Antonio Pezone