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ABSTRACT

The amendment to be made to the pumps and the turbines to turn with the dual separated supply until to the impeller, consists in the extension of the input section and in the division into four parts of the same, continuing this division also in the inner part of the pump casing, until the impeller in rotation, perfectly following the profile; the rotation of the impeller leads to a depression in the center of the impeller itself which coincides with the incoming section of the four separate streams, therefore, facilitates the entry of the flows even if the same are fed with different positive pressures, as they go in the same direction and They meet only in the impeller, alternating in succession in the same quarter of the rotating impeller sector. Therefore, both for the pumps, both for the turbines, if we feed the two inlet ports with the same pressure they function with the same performance of the pumps and existing turbines. If instead we feed the inlet ports at different pressures, the output of the pump have the sum of the flow and the maximum inlet pressure; while the output of the turbines we have the sum of the flow and the maximum kinetic energy exploited, even if the greater pressure is entered through one of the two feeding ports (Pascal’s principle).

The applications illustrated in this patent application should be sufficient to dissipate the fog which has hidden the pumps with the dual supply until the rotating impeller, which, despite the simplicity, are a powerful tool for water conservation and clean energy production. We can easily imagine that industrial applications are endless and revolutionary, because all systems in which circulates’ water for any reason (heating, cooling, water distribution, industrial processes), in open or closed circuits, in fixed and mobile version, if redesigned, following the examples shown, inserting the pump with dual power and turbines appropriately, They may allow huge water savings and become not only autonomous from the energy point of view, without polluting and without consuming raw materials, but can even produce energy to power the surrounding electric services.

All vehicles can travel without fuel, using the air compressibility and the not compressibility of water with the mechanical control technology, Electrical, Electronic developed.

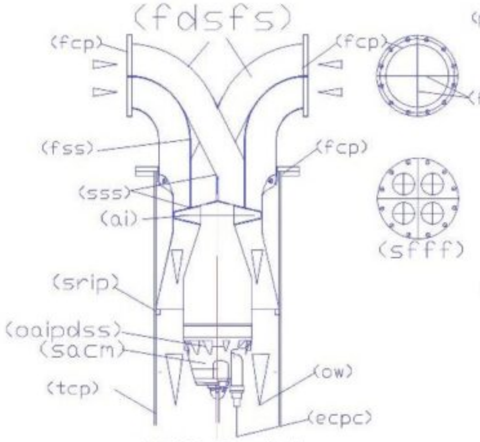
DESCRIPTION

The technical field of this inventionis saving water – energy and the production of sustainable and clean energy in the world.

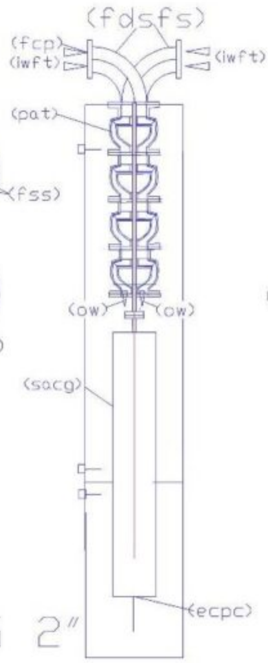
The state of the art in the use of water and energy, the fight against pollution and the production of clean energy at low cost has been conditioned from an incorrect interpretation of the fluid dynamic principles, which have resulted in enormous waste in all areas of humanactivities. In fact, industrial development has focused almost exclusively on energy fossil. Although hydropower accounts for about 17% of world energy, the easier production of energy, with the hydraulic jump, with the currents of the rivers, ocean waves, did not stimulate the inventors and designers to study hydraulic circuits that make better the characteristic incompressibility of the water and the air compressibility, both to save drinking water, both energy, and also to increase the production of hydroelectric energy. In fact, the water that produces energy is used one way, while the lifting of water for the defense of the territory, for the distribution of water for agricultural, municipal and industrial, is the second most important energy expenditure of the planet, right after the transport. This energy expenditure, relying in large part on energy fossil, consequently, is a very serious source of global pollution.

The undersigned, who studied hydraulic circuits that are able to produce energy also from waters devoid of hydraulic jump or natural kinetic energies, has arrived to the conclusion that to save energy by the global management of the water and at the same time, produce, in most cases, are necessary electric pumps with separated double supply unto the impeller, and in some cases also of turbines with such characteristics. The simplicity of the amendment necessary to the transformation of the existing pumps and turbines from single to double separated supply should not detract from the inventive value of this invention, because if even today, after almost two centuries of industrial development, we can not get around the gravitational force to lift the water and we can not produce sustainable energy from water, it is precisely due to the absence of this invention, that is essential also to produce hydroelectric power in the mobile version, because it can be used to replace internal combustion engines in the transport of future.

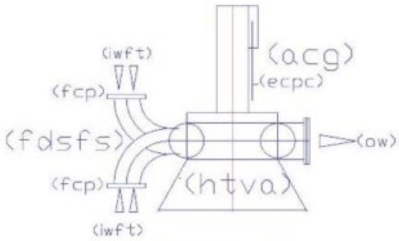
BRIEF DESCRIPTION OF THE DRAWINGS



"FIG 1"



"FIG 2"



"FIG 3"

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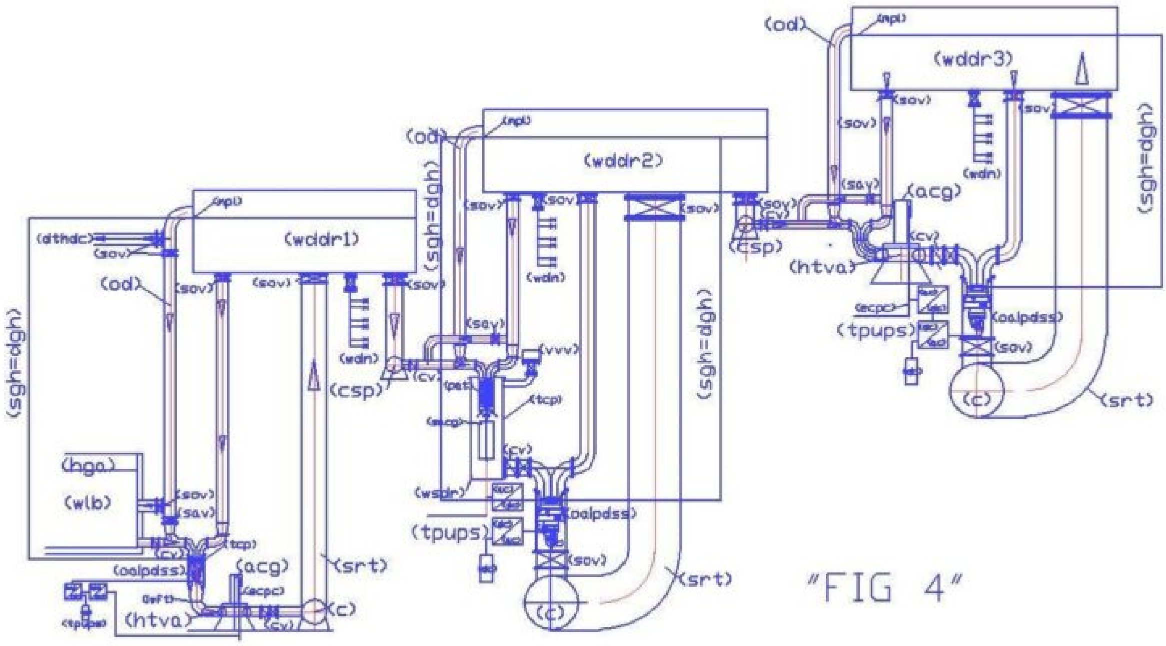
FIG. 1 is a schematic representation of a overturned pump with separate double supply until the impeller, coupled to a submersible electric motor.

FIG. 2 is a schematic representation of a multistage pump used as a turbine with separated supply until to the impeller coupled to a current generator (sacg).

FIG. 3 is a common representation of a turbine with double separated supply until the impeller with vertical axis, coupled to a current generator (acg).



"FIG 4"

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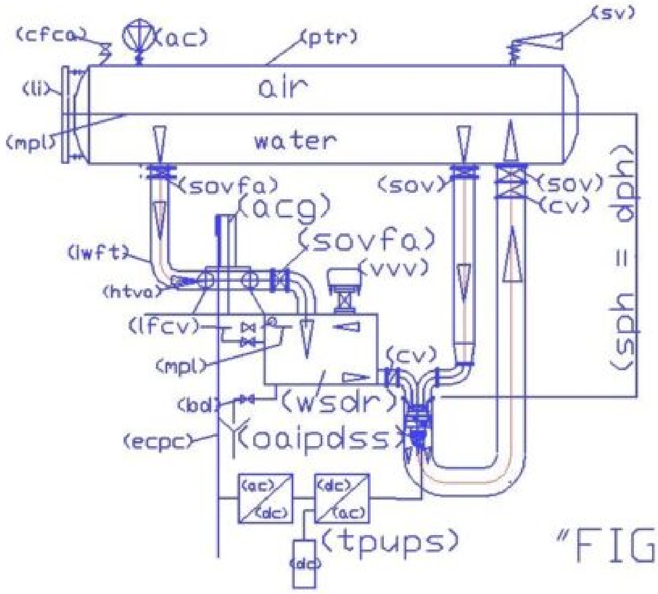
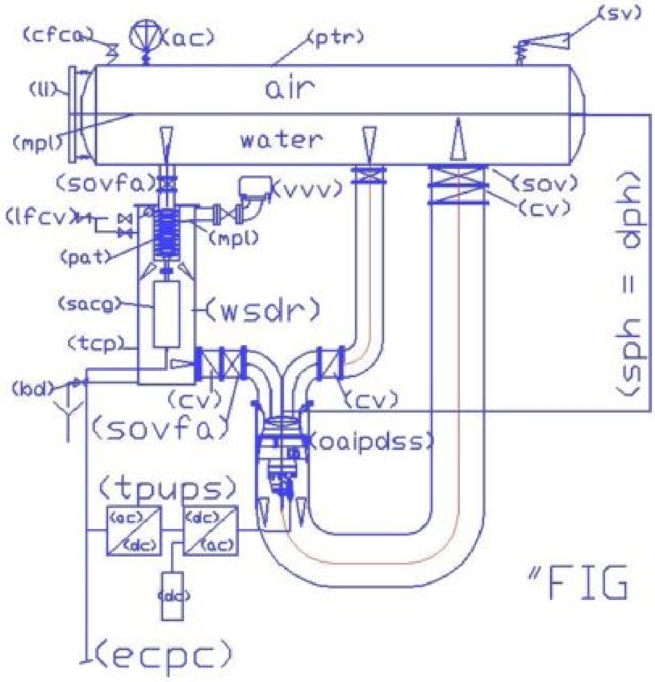
FIG. 4 is a water pumping plant built in steps, where you see the various possible conbinazioni coupling between pumps and turbines with double and single supply with the water recycling. These systems to function must always have the basins (wddr) filled to the maximum level (mpl) and the pipe (srt) must be of large cross section, so that they can be considered as the extension of the upper basin bottom (wddr 1-2 -3). The water that comes from the distribution networks (WDN) must be less water raised from the source reservoir (wlb). The water that beat from the overflow (od) feeds sempe the feed opening with less pressure of the pump or turbine with dual separated supply. The energy produced with these schemes is always much higher than that consumed because the water in the collector can download it (srt) connected to the reservoir (wdr) always to the maximum level (mpl) is considered almost as a pressure loss at the outlet (v2 / 2g), which is independent of the higher hydrostatic head of the basin (wdr), since the static pressure is not opposed to the kinetic energy being water incompressible. While the water that comes down from the basins (wdr) and feeds one of the pump inlets or turbine gains kinetic energy (1/2 * m * V2 / 2g) which can also be called dynamic pressure.



"FIG 6"



"FIG 5"

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FIG. 5 is a hydroelectric current generator that uses a water tank pressurized with compressed air, which feeds a submersible pump used as a turbine (pat) which discharges the water in a tank with venting of air, at atmospheric pressure, which feeds a mouth of the pump with the dual separated supply, that with the other mouth directly receives the water of the pressurized tank, while the delivery of the pump has the sum of the two flows of water and the pressure of the pressurized tank. All the water that comes out from the pressurized reservoir back into it and the air-cushion does not expand, but exerts on the ‘water pressure circulating inside and outside the tank. Therefore, the pump with the dual separated supply, not having to restore the air cushion works with a low prevalence, However, the rotation of the pump converts the static pressure into dynamic pressure of water ducted and allows the recycling into the pressurized tank of water discharged from the turbine which has produced hydroelectric energy by means of the submersible current generator (sacg).

 FIG. 6 represents the same solution of FIG.5, but using a normal vertical axis turbine, then, with the water drain tank, which does not incorporate the group turbine – current generator.

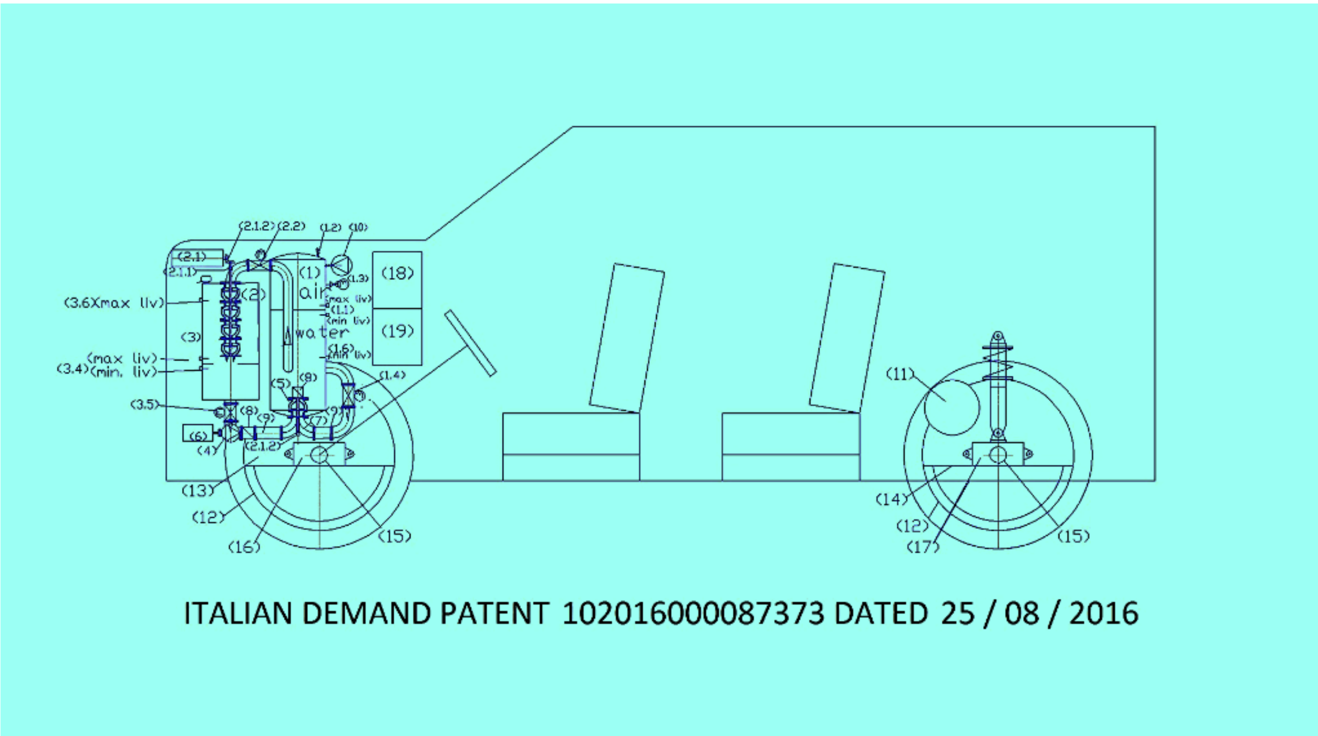

FIG. 7 shows a generic “hydro motor vehicle with variable speed engines”,   in which the autoclave system with dual separate supply pump until the impeller replaces the heat engine. The legend of the drawing is shown in the detailed description.

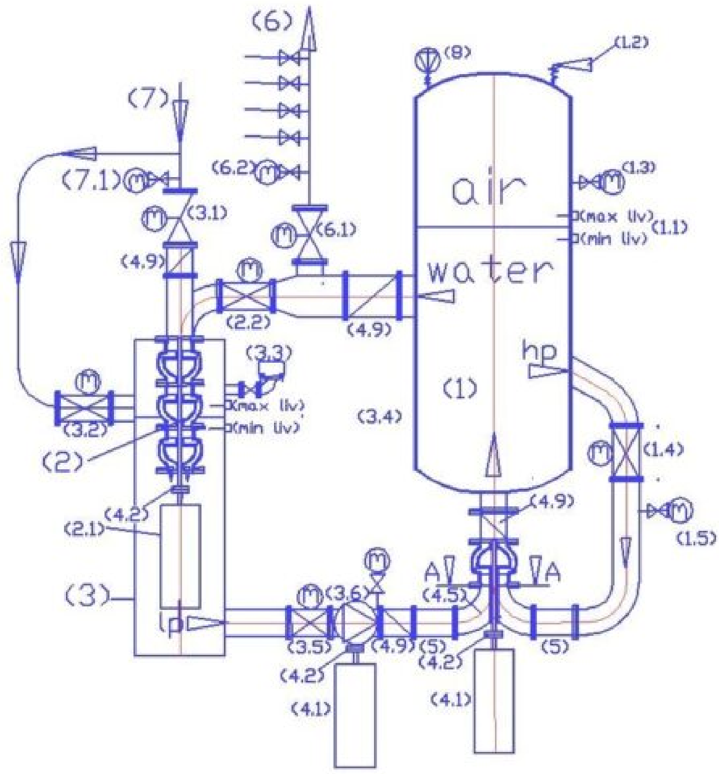

FIG.8

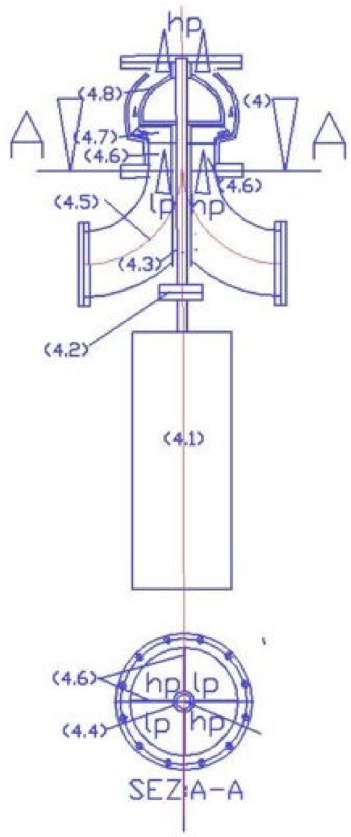

FIG.9

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FIG. 8 shows a generic “autoclave system for water pumping with energy production” this plant produces energy only when the lifting system does not require water to be lifted or it requires little, therefore, the whole or a part of the water that comes out of the autoclave is diverted towards the pump used as a turbine. This installation for producing low cost energy must work with the constant level of water in the autoclave (1.1), therefore, it raises the water network (6) the same quantity of water drawn from the mains supply (7) through the valve (3.2).

FIG. 9 shows the enlargement of the pump with the dual supply until the impeller of FIG.8, but the particular is also valid in the FIG.7 and the other figures. In section A-A you may be noted the division into four areas to 90 degrees of the power supply hole by means of the metal sheets (4.6) that reach until to the closed pump impeller (4.7). The legend of FIG. 8-9 is shown in the detailed description

DETAILED DESCRIPTION

This description and the drawings listed above faithfully reproduce the priority document consisting of the Italian patent filing 102015000048796 dated 07/09/2015, with the following updates: Partial modification of FIG 1, 2, 3; Inserting FIG. 7, 8, 9 with its legends and short notes.

Legend of drawings FIG. 1, 2, 3, 4, 5, 6: (ac) air compressor; (acg) alternating current generator; (ai) axial impeller e; (C) collector ; (cfca) connection for fast fill compressed air; (csp) connection systems pipe; (cst) containment system tube; (cv) check valve = valvola di ritegno; (dgh) delivery geodetic height; (dthdc) deviation towards hydraulic drainage canals; (ecpc) electrical current produced cable; (fcp) flange for coupling to the pump ; (fdsfs) flanged dual supply and flow separator; (fss) flow separator in sheet steel; (htva) hydraulic turbine with vertical axis; (iwft) inlet water to feed turbine; (lf) lift ring; (lfcv) level floating control valve; (mpl) probe of the minimum or maximum level; (oaipdss) overturned axial intubated pump with dual separated supply;

(od) overflow discharge; (pat) pump as turbine; (ptr) pressure tested reservoir;(pwa) pump with autoclave = pompa con autoclave; (sav) supply additional valve; (sacg) submersible alternating current generator; (sacm) submersible alternating current motor; (sfff) special flange with four feeds; (sgh) suction geodetic height; (sov) shut-off valve; (sovfa) shut-off valve with flow adjustment; (sph) suction piezometric height; (srip) supporting ring for intubate pump; (srt) supply reservoir tube; (sss) shaped sheet steel; (sv) safety valve; (tcp) tube containing the pump; (tpups) three-phase UPS; (wdn) water distribution network; (wddr) water distribution and disconnection reservoir. (wsdr) water disconnection reservoir.

The state of the art in the use of land water resources and hydropower production was affected by the absence of synergies between the pumps and hydraulic turbines and from the incorrect approach to the gravitational force, which is not to be won by the hydraulic lifting but sustained, with one-way movement of water, where the pumps, oriented with the downflow, exploiting the hydrostatic head, the principle of communicating vessels, and the law of Pascal on the transmission of hydraulic pressure to overcome the pressure losses circuits, producing energy by recycling and even lifting the water. The watershed for the hydraulic and hydroelectric engineering alternative was the invention of submerged hydroelectric plants, by the undersigned, who are intubated vertical plants submerged in the water, not yet realized. Considered by many not feasible because it would produce hundreds of times more energy expended. However, who does not believe we did not expand sufficiently the topic. In these installations are inserted in series an overturned pump, that pump down, and a turbine, which hydraulically behave as installations under the head with the open basin recycling. The hydrostatic head, measured in meters of water column is chosen after having carefully calculated the load losses in the turbine and in the tubes, to put down the axis of the pump at the exact point where the positive pressure alone is capable of balancing the resistance to circulation water, including the turbine. The pump has only the task of winning the state of inertia of water inside the tube that feeds the pump and the turbine, consuming very little energy, being positioned between two equal and opposite loads.

The rotation of the pump, placed in such conditions, produces in the whole overlying water column, the descent of the water separated from the static surrounding waters, with an energy of pressure (m * g * h) and kinetics (1/2 * m * V2), which are used in the turbine to produce energy. Assuming that the overall performance of the coupled turbine and current generator is 0.8. The useful power can be supplied by a turbine which uses entirely the payload Hu than 50 m, with a intubated pump which has a flow rate of 1 m3/s, will be Pu = η*1000*Q*Hu/102 = 0,8*1000*1*50/102 = 392 KW; while for rotating the pump in the conditions of balance between the positive head and the turbine just a prevalence of a few cm of water column. Assuming to work with an electric pump which has the same scope, prevalence 0.2 and 0.7 the yield, the power consumption is 2,8 KW (1000*0,2/102* 0,7). The ratio of energy produced and consumed is 392/2,8 =140. Nobody ever thought of being able to produce energy with infrastructure investment so low, withdrawal from renewable energy such as static pressure and the height of the hydrostatic pumps, although these are always considered in the hydraulic calculations for the determination of the heads of the plants and pumps prevalence for save energy in hydraulic lifts. I think that if it is possible to exploit the hydrostatic head to save energy by pumping water up to win the atmospheric pressure, it is also possible to transform the hydrostatic energy with the help of atmospheric pressure, not raising but pushing waters static downwards, after intubation of the same. In fact, when in nature occurs spontaneously, intubation of a vein of water flowing down a hill, through a valley and goes back up another hill, in the valley we can make the famous artesian wells that do not need pumps to lift waters. This means that, in addition to producing energy submerged we can exploit the energy of static pressure, natural or artificial also in other hydraulic applications. In fact, every invention opens the way for other inventions, if applied in different contexts.

Before the world was made only one prototype of hydroelectric submerged, to seek confirmation and feedback to their insights, the undersigned has designed other systems that are still closer to the perpetual motion, not being able to take advantage of natural energy such as hydrostatic head of a lake or sea. In fact, the "Hydro power plants with lifting, recycling and distribution of water in an open vessel" and "Generators perpetual with compressed air and recycling water ", which use the same hydraulic principles, in non-submerged installations. But these two important plant applications, which are essential for environmental protection, resource conservation and sustainable energy production can not be realized without the invention of the "dual separated supply inlet pumps," They are all very simple inventions for those who know the basics of fluid dynamics.

To understand how a pump or a turbine dual fuel must be observed FIG. 1 – 2 – 3, which shows changes to make on the suction side of the pumps and turbines; Fig. 4, which shows the mounting positions and possible links of a general scheme of lifting and water distribution, and recycling in an open vessel, which enables the production of hydropower; the Fig. 5 – 6, which shows the mounting positions of two patterns of recycling water mixed: in opened vase and closed pressurized, usable for the perpetual production of hydroelectricity (no fuel) on mobile means. As can be seen from Fig. 1 – 2 – 3, the suction side has been modified by dividing it into two symmetrical parts with flow separators and flanges. Particularly important it is the special piece (fdsfs) mounted at the pump to achieve the double feed. You may notice the separators flow sheet steel (fss) that divide into four parts the two feeding mouths of the pump and reach down to the rotating impeller (ai), where the metal sheets are shaped (sss) following the profile of the impeller same. The modification serves, in addition to the separation of the flows, to reduce turbulence and to avoid that the water pressure higher contrasts with the feeding of the water coming from the reservoir at the lower altitude, or atmospheric pressure, in the case of pressurized systems. In fact, the rotation of the impeller acts as an anti-return device. Also thanks to the pressure of the upper reservoir, increase the depression input on the side with lower pressure. They are known and widely experienced applications of pumps and turbines in which, the movement of an impeller to form a vacuum in the inlet pipe and the water circulating with a centrifugal acceleration which is proportional to the square of the angular velocity and the radius of rotation. In the cases that we examine we put the pumps in the same conditions in which, today, operate the turbines that exploit the hydraulic jump, but the equip of a dual separated supply, so that in the body of the pumps and turbines can be to sum the inlet flow, while for the Pascal principle, the higher pressure spreads in all parts downstream of the input section by improving the energy efficiency of the turbines and saving energy costs for lifting to the pumps. Obviously, the proposed amendments concern also and above all, the design of the plant, but if you do not change, especially pumps, as aforementioned, it is not possible to produce energy from those plants. Is so true that to the state of the art exists only hydropower that exploits the hydraulic jump, or currents of natural or artificial water, without the recovery and recycling of water. Unfortunately, manufacturers of pumps and turbines build machines to meet the needs of the plants. If the implants are wrong, from the energy point of view, also the pumps are wrong. Therefore, it is necessary redesign the systems and pumps not only save energy, but also to produce it raising and distributing the water.

In Fig.1 you can see one of the more common plants of the future. The flanged coupling with the container tube (tcp) of an electric axial inverted dual separated supply until to the impeller (oaipdss), allows the electro pump to receive the flow of water intubated from two tanks at different heights and intubation of the common flow allows the cooling submersible motor. The same can be said of the pump multicellular per well of Fig. 2 and central of fig. 4, instead of being coupled to an electric motor, carrying out the function of the turbine, is coupled to an alternator submerged, equally, it cooled by water circulation in the container tube , which also performs the function of the reservoir of disconnection (wsdr).

The modified circulation pump (oaipdss) is a submerged intubated draining pump. For these pumps, the application is easier to understand and to realize: being equipped with a wide suction mouth connected to the pump body, where there is the impeller. No need to disassemble the pump, to change it and get with separated flows directly where the impeller rotation mix the two flows and sum them. But all current pumps and turbines can be changed in this way (Obviously with different returns but always better than the current performance that absorb energy only) and you will find many useful applications in addition to those described herein.

For the other types of pumps, not prepared for this application, manufacturers will change the mergers to get into the housing with separators. In particular, the pumps used as turbines, which are fed by the current entering by delivery mouth, to turn the current generator mounted in place of the motor, should be changed by expanding the current delivery mouth, which, in this application, is a bottleneck which reduces the energy production. We do not enter into the merits of the technical problems that may result is the introduction of dual separate supply, that the reversal of the pump, are certainly problems overcome, before the great advantages that the applications behave.

A new generation of systems designers will have to change everything and the pump manufacturers have to go along with them.

In all cases, with the use of pumps with dual supply, from the delivery mouth the water comes out with the pressure supplied from the tank placed at the height higher, or from the pressurized supply tank, although only one side of the pump has been powered with this pressure. While in the case of the turbines used with dual separated supply, can increase energy efficiency when they are fed from two tanks at different heights hydrostatic, as shown in Figure 4, both in the version with submersible pump (pat), and in the version of normal turbine vertical (htva). These applications, from the point of view of pressure, are nothing but the principle of Pascal applied dynamically. In fact, the hydrostatic pressure spreads in all directions in a closed tank, but if the flow of water is in motion, in the whole passage section.

Obviously, in dynamic applications, the passage sections must be sufficient not only to transmit the pressure but also to add up the flow rates. In all cases the turbines are used together with the dual separated supply pumps, in installations completely filled with water, fitted with tubes of round trip for recycling the waters bringing them back to the upper level, spending only the energy required to win the state of inertia of the water. All the rest is charged to the hydrostatic head, including the transfer, mono tube (csp) between a reservoir and the other that as currently can also be placed to tens of kilometers away. In fact, it is sufficient that the recycling takes place only near the reservoirs, where they concentrate the pumps and turbines.

In submerged plants at the turbine outlet, we have a simple pressure drop at the outlet, which depends only on the remaining kinetic energy (V2 / 2g), regardless of the depth at which occurs the outlet. This happen because the level at the intake and delivery of the pump coincide and are in the same tank. In the submerged plants are involved only the waters that enter from the top of the tube and coming out in the backdrop, which, change position and dissipate into heat energy remaining in the same backdrop. There is no hydraulic lifting but only the load losses due to the length of the tubes within the basin, which does not concern other surrounding waters. They are involved only the waters that enter the top tube and coming out in the backdrop, which, change position and dissipate into heat the remaining energy in the same bottom.

Hydroelectric plants born from the change of pumping stations, shown in Figure 4, are similar, hydroelectric plants submerged realized in a well, where for the absence of volumes of water needed, not all the residual energy can dissipate in heat, and the water is forced to rise upward, but not being able to exceed the level of the water that feeds the pump, the energy that is consumed is that due only to the pressure drop in the riser tube, which It depends only on the speed of the water and from the coefficients of friction on the walls, easily calculable for circular sections with the formulas of Bazin, [where the head losses in m/km = 1000*4*V2/C2*D, dove C= 87/(1+2γ/√D), where γ is the average coefficient of roughness = 0,16, the speed in m/s, the dimension in m]. Other formulas of other authors, are equally valid. These head losses can be overcome by increasing the pump head, or the hydrostatic level in aspiration. For energy purposes, it is preferable for the second solution. Obviously, the same reasoning is also valid for the connecting tube (csp) between a reservoir and the other which can be several kilometers long. Considering, for example, that the transport of 1 m3 / s with a pipe Dn 1000, with the formula of Bazin cited above, involves the loss of load of 1.5 m / km, for a distance of 10 Km should a plant lifting with the prevalence of 15 m, adding 2 m for special pieces and the loss at the outlet, the pump head becomes 17m.

With elctropumps yield 0.7, it require an energy consumption of 238 Kw (1 * 1000 * 17 /102 * 0,7). This energy expenditure and the electromechanical works to achieve it are outdated spacing along the way in recycling plants in open tank with pump and turbine dual separated supply (Figure 4).

The laws of hydraulics are clear, both as regards the exploitation of the suction head of the pumps (SGH), both as regards the load losses in a hydraulic circuit in an open vessel, from which depart the waters aspirated and return those pumped. The positive head to be realize on the pump shaft is given by the sum of the useful height (Hu) request from the turbine plus the head losses in the pipes (pdc) and to the outlet (pds). The length of the water network that connects the tanks (wddr) can be overcome to the hydrostatic head. In fact, if we increase the distance between a dock and the other, we need not increase the prevalence of the pumps but the height of the basin on the pumps which costs much less. Increasing the diameters of the tubes reduce the height of the plants and the operating pressures. The prevalence to be allocated to the pump is “H” is equal to the sum of:: (+) Hgea (-) Pdc (-) Pds, where:

Hga (m) = (sgh) geodetic suction: distance between the upper level on the suction side and the axis of the pump. Hga, in our case, for energy purposes, is positive, because the pump is subjected to the water level.

Pdc (m) = sum of all the losses of load of the system, which, for the purposes of absorbing the pressure energy are to be considered with a negative sign. In our case, they are represented by the descent tube, the special pieces, the resistance to the rotation of the turbine, the velocity in the pipe (rst) of connection to the vessel.

Pds (m) = pressure loss at the outlet in the collector and in the upper tank (V2 / 2g).

Never exceeding with the tube (rst) the level of the basin (wddr), by pumping in the direction of the atmospheric pressure, the prevalence of the plant tends to zero by balancing the load losses with the hydrostatic head. Obviously, to have the maximum energy produced should concentrate the load losses in the turbine reducing the other, expanding the diameters of the pipes and reducing the lengths. It is not the pump to raise the water, but without the dual separated supply of the pump the water would not be able to be inserted in the circuit from the suction side to be lifted without energy costs. In fact, the closing of the valve (sav) that feeds the left side of the pump (with or without passing through the turbine), allows to feed such side with the water of the basin placed at the lower level, the mixing and the sum of the two flow rates, which occur in the pump, enable recovery of the maximum hydrostatic level of the upper tank without appreciable energy consumption. Reached that level, closes the water supply to be lifted (sov) and opens the supply again with the water recycling of the upper basin (sav), until the water level is lowered by new and requires a new lifting. Obviously, this system can be used for large and small flows and large and small differences in height. Producing in all cases energy by consuming very little for the recycling in the open vessel, which also includes the lifting of water that fits in the recycling loop. But the system can also work constantly raising the quota overflow waters of areas subject to flooding and flooding, without energy costs, but producing energy. In fact, the pipe overflow (or) can be diverted to channels of works of hydraulic territories (dthcd).

The FIG.5 shows a perpetual current generator with compressed air and recycle water, which can be made in miniature to make it enter in a bonnet of a vehicle in place of the thermal engine, or in a more enlarged at other mobile means that require more power, agricultural vehicles, trucks, ships, planes, trains. The perpetual current generators with compressed air and water recycling of FIG. 5, are born from the same hydraulic principles of those submerged: instead of atmospheric pressure, exploiting the pressure of the cushion of compressed air on the water surface, instead of atmospheric pressure, exploiting the pressure of the cushion of compressed air on the water surface, inside the reservoir (ptr). They do not need to transform the energy of position to kinetic, but like the submerged implants, they have the need to dissipate the pressure energy and kinetic energy in the turbine to transmit mechanical energy to the alternator Which Produces electrical energy. This implies the need to discharge the water in an open tank (wsdr) (which has a different shape only to adapt to the characteristics of operation of the turbine or pump used as a turbine, but the concept is identical) arranged below and thereafter, pumping it back into the pressurized reservoir. This operation, carried out with existing hydraulic systems, would absorb more energy than that produced, since the lower basin, being disconnected hydraulically from the upper one, which, moreover, is also pressurized, the pump should win the hydraulic counter pressure to enter the pressurized circuit. But with the hydraulic scheme proposed and with the pump in dual fuel fed from a side, with the water drained from the turbine and the other directly from the pressurized tank (ptr), it is possible to let the water at atmospheric pressure through the the suction side of the pump in the pressurized circuit and recycle it to produce new energy by exploiting the same pressure of the same pressurized vessel, without which varies the pressure in the tank, as the volume of water does not change. In fact, the pump flow returns to the the pressurized tank, passing through the valve (sov) and the check valve (CV). All operations are carried out below the air cushion, without varying the volume of water present in the tank (ptr).

Therefore, without downloading the pressure of the air cushion and without varying the volume of compressed air, as is the case in the autoclave tanks, where the circuit not being closed, the air and is constantly subject to expansions and compressions that absorb energy. We can note that, if the turbine is dimensioned to exploit the entire pressure of the tank (ptr), and the pump evacuates the entire flow of the turbine, the hydraulic disconnection tank (wsdr) is kept at atmospheric pressure and then the valve of vent and ventilation (vvv) lets the air out without letting the water out. When the liquid level falls, the air enters through the valve, implementing a ventilation, which prevents depression of the tank (wsdr). Therefore, the water that enters from the pump outlet into the pressurized tank through the recycling loop, the pump with double suction mouth, stopping below the air cushion, behaves like a common recycling plant in a closed vessel, despite the hydraulic disconnection suffered along the way. In fact, the prevalence of recirculation pumps in a closed circuit, not affected by the static pressure produced by the expansion vessels closed or open.

The water that falls from the pressurized tank and by different routes, feeds the two suction mouths of the pump, it is immediately replenished by the water that returns from the delivery outlet of the pump and the circulation always occurs below the air cushion, and then there is no lift, as there is not in submerged hydroelectric and with the open-basin recycling.

While the water descents, feeding the turbines, in no case may be regarded as the simple recycle, since in hydroelectric submerged, there is only a pressure loss at the outlet in a tank volume comparable to infinity, while in the circuit with recycling, we have also the pressure drop at the outlet, and not being the infinite volume, we only need to increase the installation depth of the pump, if we do not want increase the prevalence and the motor absorption.

In the pressurized tank, the water exploits all the pressure of the air cushion to overcome the resistance of the turbine, producing power, instead of allowing the volume expansion of the air cushion which takes place in the autoclaves. Therefore, even in these plants, as in submerged implants, the load losses of the turbine are won by the positive head of the water column on the pump that circulates the water with a very small head of the pump. In the case of submerged hydroelectric, the pressure is provided by the atmosphere and by the water level on the pump, in the generator perpetual movable by the air cushion which also replaces much of the water column. Also in this case, at the turbine outlet, in the tank (wsdr), we are at atmospheric pressure and we have to consider only the pressure loss at the outlet (V2 / 2g). Right away after starting the recycling loop in closed vessel which makes use of the pump with dual separated supply, which is no different from a recycling circuit in the open vessel if one considers that the piezo metric heights on suction and discharge coincide. There is only the branch of the second suction mouth that inserts water in the circuit with a lower pressure, but being widely demonstrated the law of Pascal, on the expansion of the pressure, this water returns into the liquid volume of the pressurized tank, from which it is output to produce energy in the turbine, without having to spend no energy to increase its pressure, since the pump is dimensioned to bring the sum of the two flows which enter separately. As written above, in pressurized closed circuits for the calculation of the prevalence of the circulation pump does not count the pressure of the air cushion but only the pressure drop in the tubes of the circuit, which in this case are reduced to a minimum. These small pressure loss can be overcome by the head of the pump or from the residual pressure at the turbine outlet, which is derived, however, by the pressure of the air cushion in the tank (ptr). In an perpetual power electric generator without fuel, the main role is played by dual separated supply pumps, which for the above reasons absorb very little energy and can be fed, at start up, by means of an electric battery as current engines and thermal generators, with the only difference that these must continue to be fed with fuels while the generators perpetual use the energy accumulated by the pressure of the air or gas and by recycling water in the system. For this reason they may be called perpetual, not having to stop to fill up on fuel, at least until the gas content in the air, water dissolve excessively lowering the pressure. The pressure could lower after a few months, but this can be avoided by mounting on board a small compressor. The main stages of starting up the, which should happen automatically, with the inclusion of key control or the “start” button is as follows:

1) You close all valves (sovfa) and (sov) that intercept upstream and downstream of the reservoir of disconnection (wsdr) that communicates with the atmosphere through the vent valve and ventilation (which does not pass the water).

2) With the valves of the point 1closed it is put into service the pump (oaipdss), by means of a three-phase UPS equipped with a battery, rectifier, alternator-inverter, powered by the same energy produced. In the initial phase of start-up the water circulates entering a single suction mouth but immediately after the departure will also open the valves which intercept the tank of disconnection (wsdr) and the water can also feed the second feeding mouth of the pump which brings the water used by the turbine to produce energy. This water, which is at atmospheric pressure, is inserted in the circuit of a pressurized recycle right from the second supply inlet of the pump which allows the mixing in the impeller with that working with the static pressure of the pressurized tank.

3) When the alternator is connected to the turbine starts producing energy, can be excluded the starting circuit and run the circulation pump with the energy produced. What is important, is the use of a control system of the pump speed with inverter for the constant management levels (mpl) of the two tanks (pressurized and disconnection), since an excess of tank pressure with respect to the dissipative capacity of the turbine leads to increased speed of the turbine and a greater flow rate, which raises the level (mpl) of the tank of

disconnection (wsdr), while a reduction in pressure can lead to a lowering of the level, a reduction in flow rate and power and the entrance of air into the circuit. Adjustments must be made in exercise and automatically, especially by to the speed control of the pump, but also with adjusting the opening of the valves.

For a better understanding how this type of pump works, you can observe the FIG.9. Observing the center of the impeller we have to imagine supplied by four sectors separated by 90 degrees cruise, two of which are supplied in low pressure and two high pressure, possibly arranged diagonally to balance the hydraulic thrust on the bearings. Also, you must make a distinction between the static and dynamic pressure of system.

Observing the FIG. 7 and 8, the static pressure is the pressure supplied by the compressed air cushion that 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 double separate supply until the impeller, it is necessary to open the valve (1.4) and works the pump because the static pressure already fills the entire circuit, even coming into the impeller, but without the pump works 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 does not produce energy, being only an internal recycle to the volume of water stored. 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, therefore a higher prevalence to 12.5 bar. With the pump with double separate supply until the impeller we can perform this application that seems impossible, because coming from the suction side of the pump that is already full of pressurized water statically wander the opposition of the hydrostatic pressure, as if it were an internal circulation to volume of pressurized water. In fact, the suction pipe of the pump, which comes from the left side (open) and from the right side (closed) it is divided into four fixed and separate sectors, therefore, when the impeller rotates does advances towards the water present to the autoclave and produces in each sector of the supply pipe a depression which enters the water in the same impeller, both from the right side, both from the left side.. As soon as incoming the water is involved centrifugal acceleration towards the periphery, produced by the fins of the impeller which is proportional to the square of the angular velocity, and 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 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 supply. Therefore, the water of open circuit (no static pressure) and 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). 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, to not have drops in pressure in a pump with the dual separate supply, the pump impeller and the passage sections must be dimensioned, for the transmission of the entire flow rate and of the whole pressure.

This simple change of the pump allows us to recovered by costs infinitesimal water that produced energy in a hydraulic turbine and put it back in pressurized water recycling tank circuit without that happens the drop of pressure due to the expansion of the cushion of air, which occurs in normal autoclaves, whose recovery, would require energy from both of 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 the volume of water stored by means of the expansion of the air cushion. It is obvious that the same system can be used to produce energy if the water does not come out from the autoclave circuit. However, this has never been possible from the advent of the industrial age since lacked the invention of the pump with double separate supply until to the impeller. With this invention, it is possible to produce hydroelectric energy even on a means of transport as indicated in FIG. 7.

Legend of FIG.7 : (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 flow transmitter; (1.6) minimum level probe in the start system; (2) pump used as a turbine (pat); (2.1) alternating current generator submersible; (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.

Legend FIG. 8. 9: (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 flow transmitter; (2) pump used as a turbine (pat); (2.1) alternating current generator submersible; (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) feed electric pump in low pressure variable speed, driven by an inverter (4) electric dual supply pump on the suction side; (4.1) pump drive motor, with variable speed, controlled by an inverter; (4.2) joint pump motor coupling; (4.3) transmission shaft; (4.4) tube for protection of transmission shaft; (4.5) double curve with septa crossed separators in low pressure (LP) and high pressure (hp); (4.6) septa to flow separators; 4.7 closed impeller; (4.8) pump diffusor; (4.9) check valve. (5) flow diverter stub pipe; (6) water distribution network; (6.1) motorized valve to feed water distribution network; (6.2) pressure flow transmitter; (7) water supply line; (7.1) pressure flow transmitter; (8) electro compressor.

industrial applicability.

Since the change of the pump and the turbine to achieve the dual separate supply it is very simple, very few insiders can understand the purpose of this invention, due to the fact that the installations in which they must be installed to the state of art do not exist. To understand the importance of this invention for the purpose of water-saving and sustainable energy production it has been necessary the study of new hydraulic systems with open circuits and pressurized, because the pump manufacturers and turbines are not designers of systems, because the pumps and turbine manufacturers, focusing their attention only on the quality of the existing pumps and turbine performance, pay no attention to the improvement of the facilities, while the designers of the systems they design based on the performance of existing machines. Nessuno si è accorto che le macchine possono essere progettate secondo le esigenze di impianti che sfruttino più principi scientifici e tecnici contemporaneamente, come la incomprimibilità dell’acqua e la comprimibilità dell’aria, anche grazie alla nuove tecnologie di controllo delle velocità dei motori delle pompe e la regolazione delle valvole This is the reason why it have not been sufficient than one hundred fifty years after the invention of pumps and turbines to think about this logic change especially of the pumps that would bring saving water, energy and clean energy production with costs tens of times lower than any form of energy known, polluting or not-polluting. It would have avoided global warming. Probably, this simple but important invention would never be born, because it requires a inventiveness cross of industrial systems, mechanical knowledge of pumps constructions and scientific principles known for centuries but underestimated by science in practical applications.

It’s very difficult to explain with words and drawings the importance of this invention without creating prototypes and laboratory tests but one year of the filing of priority, it has not been enough examples of works published to find public or private lenders make this simple and strategic invention. Nevertheless, all scientific reasoning confirm the validity of this solution which involves enormous environmental and industrial developments.

Another confirmation is the same technique of construction of the hydraulic pumps, in particular, from those multistage, with closed impeller, which is used especially in pressurized applications, with both the turbine function, both with the pump function with the dual power supply separate until 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, namely that the rotation of the impeller, performs the anti-return function from the left side of the pump with the double separate supply (FIG.7 , 8, 9), fed with the lower static pressure. In fact, in the current multistage pumps, it may not reach the pressures that are achieved, if the rotating impeller and the precision machining not have potent anti-return function, since the losses of water through the yokes of the coupling between the fixed parts and rotating, 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 up to the impeller, while the other mouth recycle with very low manometric dynamic pressure the water that is equipped with high static pressure, using the same impeller.

While waiting financiers for the prototypes published, the undersigned continued to publish theoretical considerations on aspects of the operation for the avoidance of doubt inventive and industrial activity because without the pumps with dual supply even these important new solutions could never have been conceived.

The applications illustrated in this patent application should be sufficient to dissipate the fog which has hidden the pumps with the dual supply until the rotating impeller, which, despite the simplicity, are a powerful tool for water conservation and clean energy production. We can easily imagine that industrial applications are endless and revolutionary, because all systems in which circulates’ water for any reason

(heating, cooling, water distribution, industrial processes), in open or closed

circuits, in fixed and mobile version, if redesigned, following the examples shown, inserting the pump with dual power and turbines appropriately, They may allow huge water savings and become not only autonomous from the energy point of view, without polluting and without consuming raw materials, but can even produce energy to power the surrounding electric services.

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