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MARINE FLOATING PUMPING STATIONS FOR ARTIFICIAL WELLING (MFPSAW) TO INCREASE THE PURIFICATION, THE FISHING GROUNDS AND ALKALINITY.

Description

The state of art in the exploitation of marine resources has been conditioned by the hard access to the deep of the seabed. The phenomenon of the descending and ascending marine currents, known as "down and upwelling", (where it happens) produces wealth and well-being even though, unfortunately, it happens naturally in a very small part of the world, because it need that many factors have to coincide like the intensity of winds and their direction or the structure of the continental slope. Some scientists have tried to fertilize the oceans by using iron sulphate that improve the phitoplancton production but the experiments, in addition to being expensive, presented many ethical, biological and sanitary implications due to the toxicity that this product may cause in the marine environment (fish production). The solution that we propose it's the ideal one because it plays artificially the natural system. By using unsinkable floating systems and a right interpretation of hydraulic principles like, for example, the communicating vessels, the Bernoulli theorem, the Venturi pumps, we can create and re-produce this phenomenon in all the waters of the world that, like we know, occupy three quarters of the planet's surface. These plants are characterized by pipes that descend vertically for a few tens of meters with on-way pipes (in case of the downwelling phenomenon) or for many kilometers (in case of upwelling phenomenon) and stiffened by steel ropes arranged at 90 degrees right down to the seabed where the sludge containing nutrients is settled. They can cross the compensation line of carbonates (**Carbonate Compensation Depth line)**, where the carbon and the carbonates are solubilized by very high pressures in the waters that dominate the oceanic flats. In any case, in the upper part of the descending pipe, it is mounted an electric, axial and ducted pump that works simply resting on a steel ring weld. At the same time it realizes, near the seabed, some bottlenecks that suck a portion of the fluid from the outside (without moving mechanical parts they can work also in pressures condition over 600 bar), we can suck and mix to the water that rise to the surface the air in the "downwelling" or, thing more interesting, in the "upwelling", carry the inorganic carbon, the carbonates and other elements dissolved in the water. These elements, on surface, with the atmospheric pressure, regain the low solubility that characterize the sea salts ad, overall, are at the origin of the formation of the **calcium hydrogen carbonat** that exists only in solution. $\underline{CO_2}(g) + \underline{H_2O} + \underline{CaCO_3}(s) \leftrightarrow Ca(HCO_3)_2$. The calcium hydrogen carbonat in the ionic form is written as follows: $Ca^{2+} + 2HCO_3^-$ (calcium + carbonic acid). The balance beetwen the CO2 dissolved and the calcium carbonat it's the main element that determines the alkalinity, the PH and the concentration of calcium dissolved (Ca^{2+}) from the fishes draw the necessary calcium for the formation of skeletons and shells in addition to the survival of coral reefs. In fact, when CO2 is in excess respect of the calcium, it dissolves in water to produce carbonic acid (CO2 + H2O ↔ H2CO3) leading ocean acidification and the extinction of fish species that are most in need of shells and skeletons. Since the advent of the industrial era, the sea has gone from a PH of 8.1 to the current average of 8.25. Since this is a logarithmic curve, this loss corresponds to a loss of alkalinity of 30%, which already is the cause of the disappearance of many species of fish and most of the coral reefs. These dewatering stations are part of a project for the protection of the global environment GSP (global synergic plants), which can not be delegated to individual commercial, agricultural and industrial initiatives, disconnected from a global design in which all nations should join. In fact, the defense of alkalinity and productivity of the sea (in this case, even with increase of unprecedented productivity) should be made also through as provided in other projects: the capture of CO2 from the urban and industrial chimneys (CCPC); the provisions in the buildings synergistic vertical (VSB) produce fresh water from alkaline to send the seas, exploiting in particular, the CO2 captured from the chimneys, purifying wastewater, stormwater, and water cooling of thermal fossil, in combination with the calcareous material stored in greenhouses scrubber, developed in length and height, parallel to the buildings digesters, driers composters linear (LDDC), provided in another project, of equal lengths that also recovers wasted heat from power plants to produce, in a mesophilic process, biomethane and natural fertilizers for agriculture. With high yields, the two systems parallel exchange by air and submerged gas and biomass increase productivity. This is described in an another project yet (GSPDPTC) "Global synergic plant for depuration biomass production and thermoelectric cogeneration." It provides even the section (GMLED) "global marine and lacustrine environmental depuration" that purifies and made alkaline polluted surface waters, returning to the sea while it sends the sludge digesters at the plant (GSPDPTC).This system should be applied in very shallow polluted water near the coast, where they can not run the artificial upwelling and downwelling. The marine fish production will have a development well above the permitted food production from land animals and with lower costs, if we consider that we have an area (the sea) three times larger than the earth, and that, for various reasons, 55% of the land is not productive, and desertification is advancing at a rate of 12,000 km^2 per year, the proposed solution allows to produce power without need of plowing, sowing, fertilising, watering spray pesticides, as is necessary in order to reap the fruits of the earth and animal husbandry: for produce a kilo of beef is required 15,000 liters of water (considering the average life of cows). But even food scraps of this huge fish production can help to produce energy and organic fertilizer for the land. But in addition to fish, the oceans fertilized by our plants, can produce without polluting macro algae, as occurs near the coast, because the precipitation in the seabed do not subtract oxygen to other species and do not produce sediment. They are solubilized in water by high pressure and not rise to the surface. To realize the marine dewatering stations it is necessary to create floating platforms and towed to use as a construction site (complete with hydraulic cylinders and wire rope winches) to serve as superior support and as a means of transport of floating platforms that will be released into the sea to definitively support the piping. They will be mounted vertically on the top platform and passed to the platform below and to the sea through a bore immersion. In fact, a system which fetches carbonates and nutrients to six miles in depth may exceed the weight of five million pounds. Only the perfect verticality of these plants, the absence of destabilizing loads, the internal hydrostatic pressure perfectly equal to the inner one, enables us to design and mount them. Thanks simples hydraulic principles the internal and external pressures are equivalent to tubes immersed. This not only allows you to withstand enormous pressures but also allows you to use hydrostatic pressure to create ocean currents ducted with very low energy consumption. It may seem impossible but creating a plant upwelling which creates a vertical current of 4000 L / s long six kilometers nutrient rich and carbonates requires only a power of about 12 kW. While downwelling a plant that harbors the same amount of hydrogen peroxide in a polluted coastal seabed 200 meters deep requires only 6 Kw. This even means that we with little energy consumption can cooling the superficial water contributing to cooling of planet while increase fishes production and alkalinity. The space above the platform for energy production will be very little, and we can utilize in for industrial or touristic scopes. Indeed, by calculating the position in which we install the pump, under the head, we can do so that the curve of the resistant conduct and the pump curve that insert for the circulation would meet on the zero line of the geodetic head and where also the kinetic energy and pressure on suction and discharge are reset each being P1 = P2 and V1 = V2 (due to the swing on the pump specially calculated) according to the relationship $H = 0 = (P2 - P1) / \gamma + (V2^2 - (V1^2) / 2g$. another basic principle on which these systems are based is the theory which is based on the Bernoulli notes Venturi pumps that allow you to suck from the abyssal depths, without the mechanical part of the water or sludge present in the seabed. fact, the Bernoulli law states that: "If the fluid flowing in a conduit provided with a constriction in which V1 and V2 are the speeds, S1 and S2 are the respective surfaces of the sections, the manometric pressures P1 and P2 measured at those sections, to the principle of conservation of energy is established the following relationship: $P1 + P2 + ½ d ½ d = V1^2 V2^2$. the constancy of the value of the expression shows that, the greater and 'the speed difference in the respective sections and the smaller the pressure difference, and vice versa. Unfortunately, the average depth of the ocean waters, corresponding to the abyssal plains, ranges between 3000 and 6000 m, but on the other hand are characterized by the absence of waves on the surface. This allows us to design systems fully floating. It briefly mentions the floating system in existence, without which the floating pumping stations could not be realized. Are known watertight chambers used in submarines that with the filling water sink and with the compressed air back to the surface, but today there are also modular elements floating in polyethylene coupled in vertical and horizontal direction by means of galvanized steel profiles or stainless steel , with dimensions 3500 x 2000 x 1000 mm, average density 935 kg / m3, buoyancy for each element submerged 5325 kg, but also these modules can adjust the thrust if filled with water or air. These modules are used to make floating houses, yards and marine lakes, temporary roads etc. In general principle, it is preferable to realize "downwelling" in coastal areas and lakes, which also have a cleansing effect, while the wide oceans, especially where they exceed the carbonate compensation depth, it is preferable to realize "upwelling." The difference between these two systems is that the discharge pipe "downwelling" stops taking you into the seabed surface water and oxygen without trace, while the "upwelling" dates back to the top from the bottom sucking pressurized water or sludge. On the fundamental importance are the water pumps to be used, which must be protected from large fish species that could put them out of operation. For this and other practical reasons were chosen ducted axial pumps, which must be run for only fell inside the pipes lifting placing them on a ring welded inside the pipe (srdp). But it is preferable that these electric pumps are slightly modified in order to work on the downward side of the pipe (dt) with the suction side at the top, also, you do not need the wide range of prevalence rates that we use in terrestrial plants.

Assuming that for the realization of the load-bearing platform (sbp) to the weight of the tubes, estimated at about 3,800,000 kg. it need to add 400,000 kg for the frames of containment, it will take about 800 N floats (4,200,000 / 5325), which cover a total area of approximately 5600 m^2. These modules will distribute them on two floors to make a floating platform about 60 m per side (3600 m^2) and includes airlocks metal beams and supports. At the center of this platform is realized the hole of immersion (ih). Above this platform will be built the base platform of the yard towable, of equal size in plan but of height such as to embed the lifting cylinders (hc) with the useful stroke of 6 m, which will be mounted on a bridge crane (bc) with the hoists, which serve for the mounting and the vertical transport of bars of tubes 12 m long, the relative bearing structure (ssbc), the frames in multi-storey load-bearing approximately 600 stations winches with the relative ropes (sr). The two floating structures are mounted overlapped on a construction site port and held together by a series of pins steel pivoted (hsp) that moved by suitable hydraulic cylinders or pneumatic parade them from their seat separating the platform. The two platforms coupled and overlapped be towed and transported to the point where you construct plants. The upper floating structure using a hydraulic system for the movement in the vertical column of tubes (dt) and (up), consisting of two vertical hydraulic cylinders simple effect (hc) with a stroke of about 6 m, which discharging the hydraulic oil in the reservoir the hydraulic control unit (othcu), lower stems of the cylinder and push down the entire column of pipes as they assemble and fit the decline of the piping will be assembled by placing the column on the brackets (hcb) mounted on the frame (sf) placed across the hole diving (ih). The frame (sf) is moved by hydraulic cylinders (hc) embedded in the structure of the dive hole (hi). To reduce the stress due to the weight of the pipes above estimates have been provided for three ropes (sr), already mentioned above) that connect the individual bars of the tubes at the Floating Platform (sbp) below. These ropes (sr) from the winches contained in the multi-storey frames (tcpwr) arranged on the outer perimeter of the platform upper float, roam the outer section (sbp) of both structures coupled, enter into the hole of immersion (ih), and crimp snap hooks are superimposed on the perimeter of the hole of immersion of the corresponding six pegs, according to the order of immersion that must have in the descent of the pipes.

When assembly is completed the lower structure will be free from the top through the final trip of the snap hooks from the winches, still attached to the ropes (sr). It will be necessary to unscrew and separate trims mating terminal (sfep), come off the pins with hydraulic or pneumatic control (hsphc) that combine two structures, finally lighten the sealed rooms of the upper buoyancy of the water emptying and filling of air compressed and do the opposite operation with the lower structure. At this point the upper structure is separated from the lower floating at a higher level and can be towed to return to the shipyard port to mate to a new platform, wearing off to achieve a new plant, while immersed platform will be completed with the mounting of the socket connection (sc), other equipment, the cover and solar panels. assuming the appearance of of the FIG. 3.

Legend = Legenda

(ac) auxiliary cables; **(ai)** axial impeller; **(aip)** air intake pipe; **(apos)** abyssal plain ocean seabed; **(bc)** bridge crane; **(bcb)** bracket cross bracing; **(br)** bracing; **(cb)** clamp brackets; **(cdip)** capsid dewatering intubated pump; **(cs)** coastal seabe; **(des)** dished end steel; **(dt)** descent tube**;(ep)** electrical panels; **(faip)** flexible air intake pipe; **(faisl)** float with air intake and signal lamp; **(f)** filter; **(float); (fsp) f**lange for support pipe; **(hc)** hydraulic cylinder; **(hcb)** hydraulic clamp brackets**; (hcbf)** hydraulic clamp brackets fixed on supporting base platform; **(hpec)** hole for the passage of electrical cable; **(hsphc)** hinged steel pin with hydraulic control; **(ih)** immersion hole**; (ipc)** imput power cables; **(itmfp)** integrate tube in mfp; **(iwfp)** inlet water to feed pump; **(ls)** loft in steel**; (mfp)** modular floating made of polyethylene; **(na)** navy anchor; **(nl)** night light; **(oncw)** output nutrients and carbonates rich water; **(oow)** Output oxygenated water; **(othcu)** oil tank and hydraulic control unit; **(pc)** power cable **(pp)** perforated pipe; **(rlp)** ringbolt for lifting pump; **(sbp)** supporting base platform; **(sc)** socket connection; **(sfep)** special flanged end pieces; **(sm)** submersible motor; **(sn)** safety net; **(sp)** solar panels; **(srdp)** supporting ring for dewatering pump; **(ssbc)** support structure bridge crane; **(tvai)** throttling venturi air intake; **(tvnci)** throttling venturi nutrients and carbonate intake; **(tcpwr)** transportable chassis with many electric winches for the descent of the ropes; **(ut)** uphill tube; **(wfr)** waterproof floating rooms; **(wl)** water level.

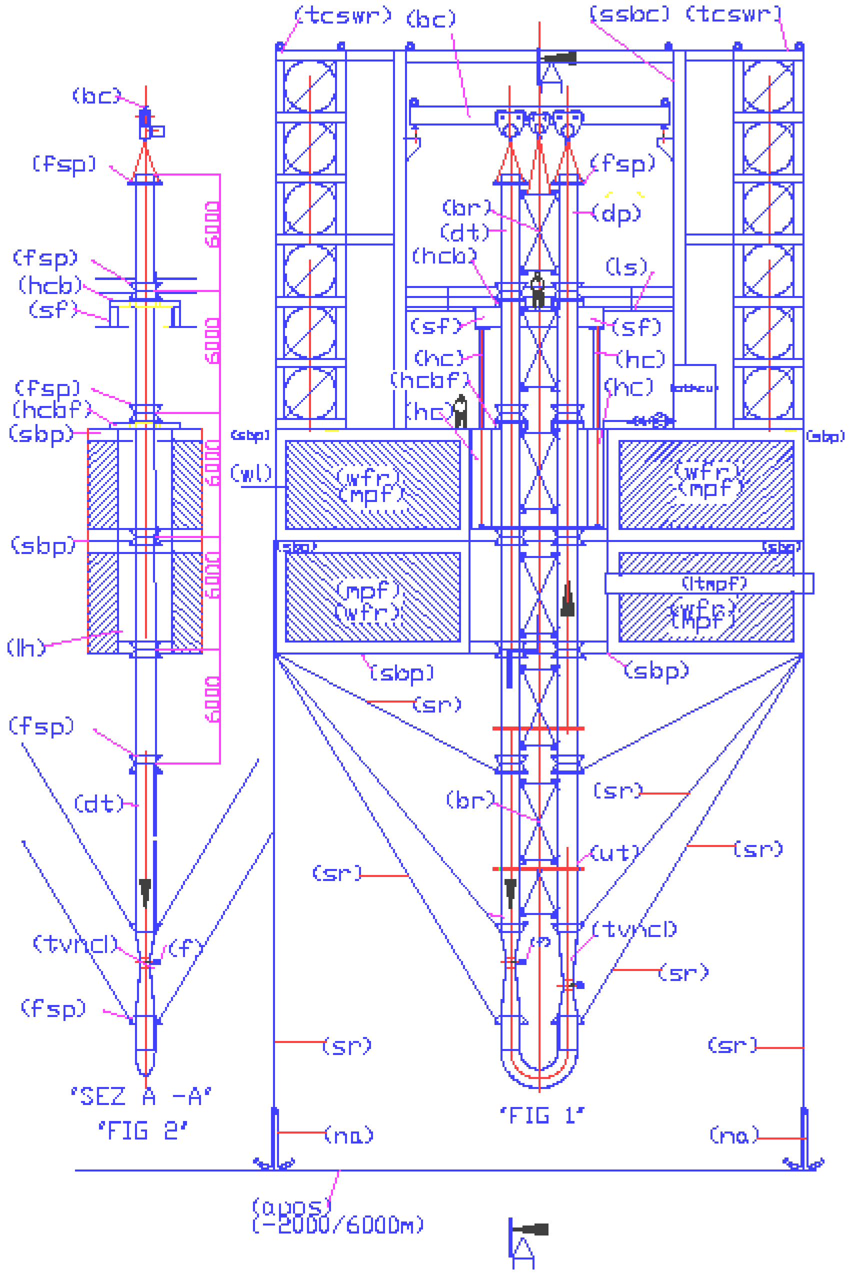

Figure 1 shows the system for the laying of the pipes which can not be carried out with normal crane vessels being provided float and depth of several kilometers. it gives an outline of the modular structure of floating polyethylene (mfp) and waterproof floating rooms (wfr), on which is

placed the yard comprising: a gantry crane (bc) with its fixed support structure (ssbc); a series of electrical winches mounted on frames of six floors (tcpwr) fixed between them, to the basic structure of the platform (sbp) and the fixed structure of the bridge crane (whose ropes used to lighten the axial load of the tubes in which circulates water and bracing on all four sides of the pipe (dt) and (ut)); two hydraulic cylinders (hc) embedded in the hole of immersion of tubes dimensioned to support the weight of the entire column of the tubes full of bracing up to the maximum depth; a hydraulic power unit with tank and oil circulation pump that feeds the cylinders mentioned above and those of the lesser size.

Figure 2 is the sction of Fig.1. We can see the immersion hole (ih) and hydraulic clamp brackets fixed on supporting base platform **(hcbf).**

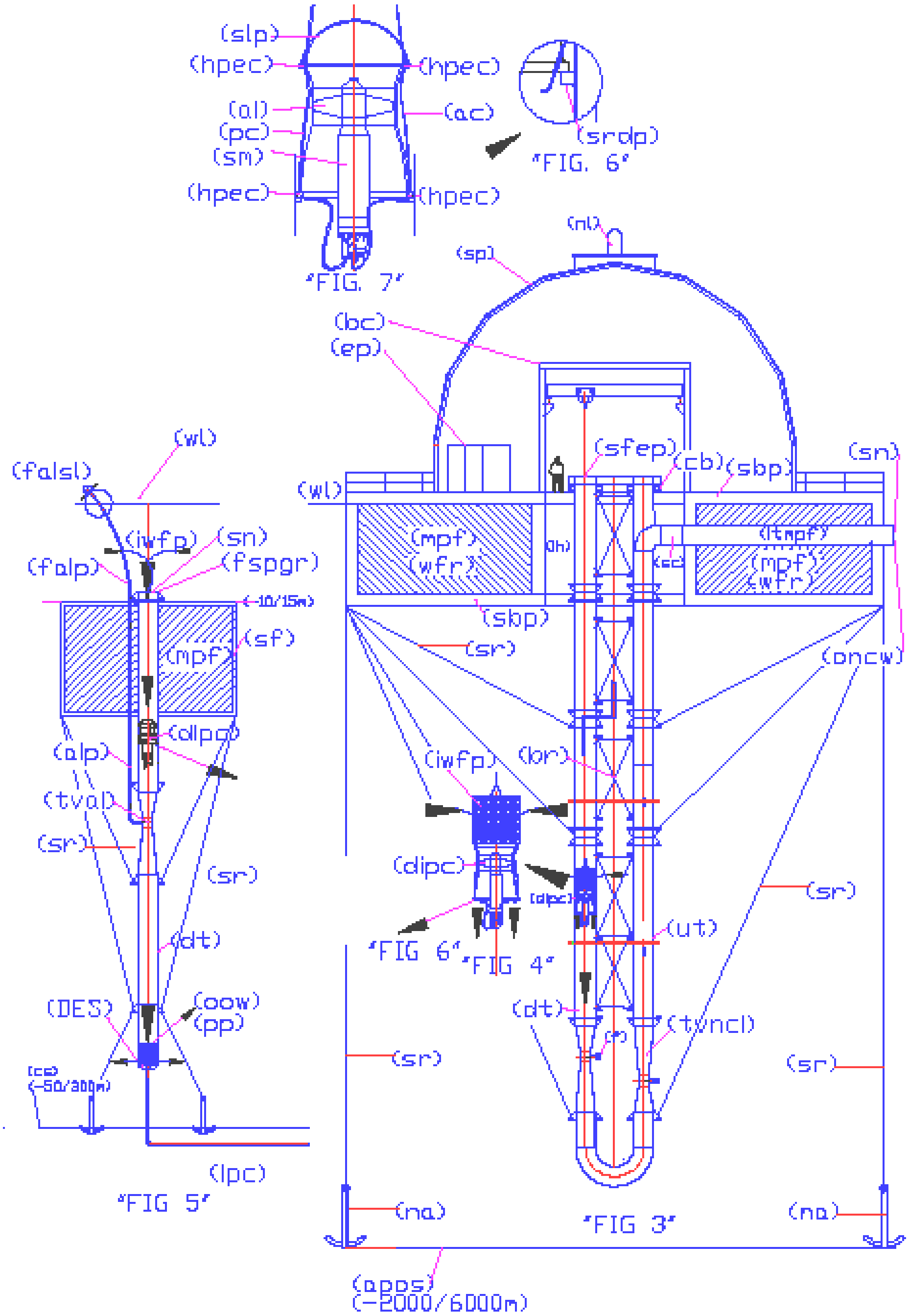

Figure 3 shows the artificial system lifts water (upwelling) definitive, without the heavy construction equipment used for the drop in the pipes (dt-ut). You may notice that the platform (sbp) was mounted in a lightweight semi-cylindrical dome covered with solar panels or solar

thermal energy production as well as fresh water for the services; a small electric hoist for the eventual lifting of the electric pump; the illumination of the night light (nl) in the quantity necessary to ensure the continuity of operation of the plant. We can note the position of the discharge pipe incorporated in the floating system (itmfp), whose socket connection (sc) it can mount only after disassembly of the lifting cylinder (hc) by means of a weld in water or with a special piece flanged to telescope. Through (itmfp) the nutrient-rich waters arrive directly in the area where it is grown plankton. Fig.4 shows the mounting position of the electric axial intubated (dipc), far below the free surface of the water in order to exploit the hydrostatic head and consume less energy; the inverted position of the same pump with the suction side up, which sucks from a section of pipe drilled. **Fig 5** shows the system for the descent artificial surface water. This solution is to be taken in the shallows and polluted and port areas. You may notice the floating system subjected to sea level of 10-15 m as not to disturb or vessels and not to be affected by the waves. Contrary to the solution with lifts of water, this solution is a one-way door in the depths oxygenated water surface and even air drawn from the atmosphere through the venturi constriction (tvai), the suction pipe steel (aip), and the hose polyethylene spiral (faip). In fact, in a polluted seabed precipitation in the depths of pollutants rob oxygen from the living species of fish and aquatic plants. As it is impossible to purify all coastal waters, as impossible to extract the sludge precipitates, should use the marine water pumps to bring the seabed surface water with more oxygen, taking advantage of low power consumption of the dewatering pumps working under the head. Fig. 6 is the detail of the support ring of the pump (srdp). Figure 7 shows the change to be realized for passage of electrical cables through the holes in the wall of the diffusers in cast iron suction and discharge **(hpec)**, being the current pumps constructed with the suction at the bottom and outlet at the top. This small artifice is required to not change the melting of the pump bodies. But in this figure, even if only symbolically, it can be noted that the motor (sm) is very small compared to the pump body, this is due to the very low energy consumption of the water pump used under the head.

Principal claims

1) Marine dewatering stations suspended by floating platforms for artificial upwelling and downwelling, characterized by the fact that are constituted by pipes suspended to floating structures that lead inside the electric pumps that produce in internal water kinetic energy that is used to aspirate from the bottom of sea nutrients and carbonates which are deposited as sludge or solubilized by the major marine depths, bringing them to the surface following the path of the pipe to increase the productivity and the alkalinity of surface waters; the system is based on the principles of conservation of energy theorized by Bernoulli, who states that: "If the fluid flowing in a conduit provided with a constriction where V1 and V2 are the speeds, S1 and S2 are the

respective surfaces of the sections, P1 and P2 are the manometric pressures measured in correspondence of those sections, we establish the following relationship: $P1 + P2 = ½ d V1^2 + V2^2 ½ d$; the constancy of the value of the expression shows that, as the speed increases in bottlenecks decreases the pressure inside the pipe and, therefore, the external liquid, also helped by the external pressure, enters the pipe and is transported to the surf.