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Subacuática

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Atlantis Resources Corporation PLY Limited

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2) SOLICITANTE (71)	Nombre: ATLANTIS RESOURCES CORPORATION PTY. LIMITED		IDENTIFICACIÓN C.C. ☐ NIT: ☐ C.E. ☐ OTRO ☐ Cual _____ NÚMERO _____
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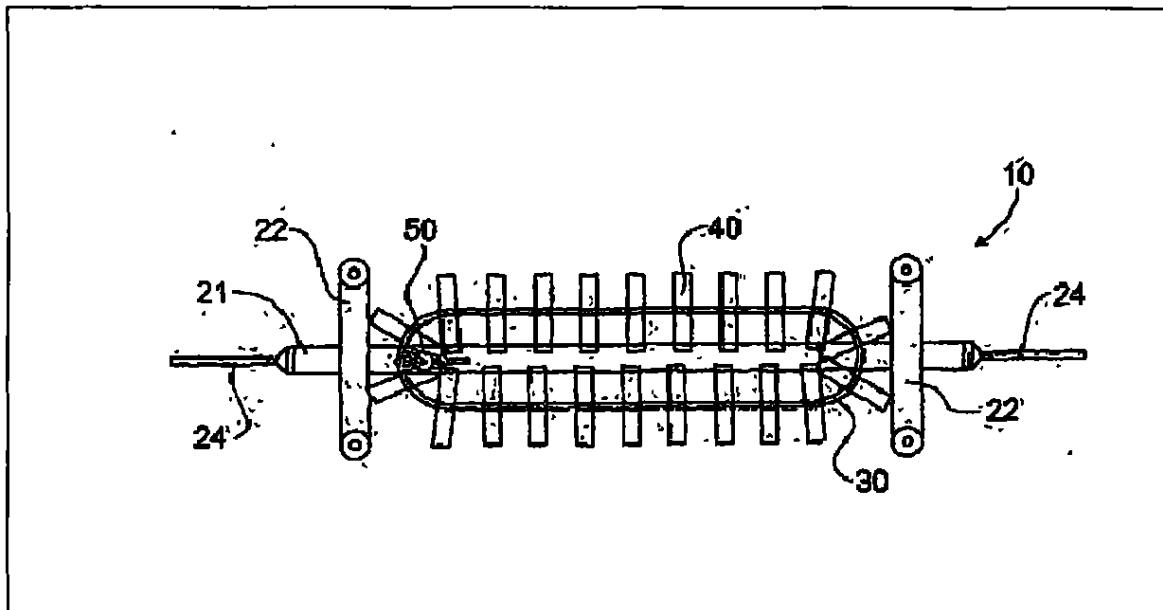
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ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud
- ☐ Comprobante de pago por reivindicación de prioridad
- ☒ Documento que acredita la existencia y representación legal cuando el solicitante sea persona Jurídica
- ☒ Poderes, si fuera el caso
- ☐ Documento de cesión del inventor al solicitante o a su causante
- ☐ Declaraciones
- ☒ Copia de la solicitud Internacional (Resumen, descripción, reivindicación, Dibujos)
- ☒ Traducción de la solicitud internacional al castellano (Resumen, descripción, reivindicación, Dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA
- ☐ De ser el caso, copia del contrato de acceso
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas
- ☐ De ser el caso, certificado de depósito del material biológico
- ☐ Arte final 12 x 12 y 6 x 6 cm
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionados parcial o totalmente con la invención de esta solicitud
- ☒ Otros
 1. Reporte internacional de búsqueda
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11) FIGURA CARACTERÍSTICA:



12) Solicitud concesión de la patente,

NOMBRE: DILIA RODRÍGUEZ D'ALEMAN

FIRMA: [Signature]

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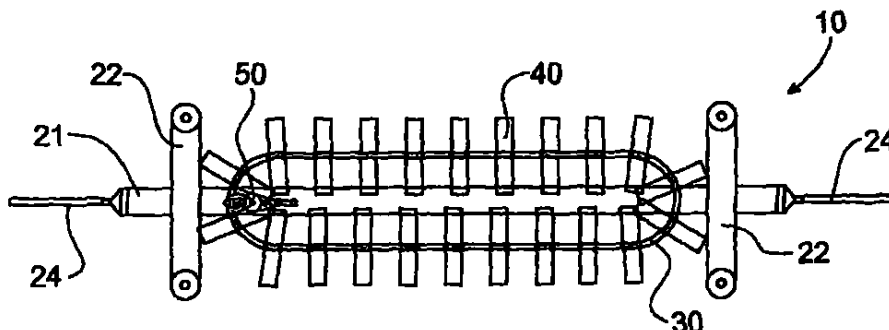
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(54) Title: A SYSTEM OF UNDERWATER POWER GENERATION



(57) Abstract: An underwater power generation system (10) comprising at least one continuous track (30), a plurality of carriages (60) that are movable around said track, at least one foil (40) attached to each of the carriages, said foils are to be driven by a water current, at least one line member connected to the carriages; at least one power take-off (50) operatively connected to said line member; wherein the driven foils cause the carriages to move around said track and hence cause movement of said line member to power said power take-off.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette

TITLE**"A SYSTEM OF UNDERWATER POWER GENERATION"****FIELD OF THE INVENTION**

The invention relates to a system of underwater power generation.
5 In particular, although not exclusively, the invention relates to a system of converting the kinetic energy of moving water to electrical energy.

BACKGROUND TO THE INVENTION

Clean power generation has become a major concern due to the effects of global warming. Renewable clean power generation has been
10 developed using solar cells, wind turbines and wave turbines. However, an effective renewable power generation system has yet to be developed using ocean currents.

US Patent No. 4,383,182 discloses an apparatus for generating power from ocean currents. The apparatus is winged and is anchored to the
15 ocean floor. A number of propellers are attached to the wing and are rotated by the ocean current. The rotation of the propellers causes rotation of a generator to generate electricity. The problem with this apparatus is that the apparatus is not easily moved to cater for changes in the direction of ocean currents. Further, the generation of energy is dependant upon the size and number of propellers to
20 catch a specific area of current flow.

US Patent No. 4,163,904 discloses an underwater turbine plant for generating electrical power using ocean currents. The turbine is driven by the flow of the water current across the blades of the turbine. Again, the level of electricity generated is proportional to the area of water that the turbine plant is
25 able to capture.

US Patent No. 4,335,319 discloses a hydroelectric power apparatus that includes a powerhouse containing a power generator above the powerhouse located above the surface of the water. A hydraulic turbine is lowered from the powerhouse when the ocean currents are sufficient to drive the
30 turbine. The disadvantage with this apparatus is that power is required to extend and retract the turbine. Further, the ocean current area that is utilised is equivalent to the inlet area of the turbine.

US Patent No. 5,440,176 discloses a hydroelectric power plant similar to that of US Patent No. 4,335,319 in that a series of turbines are extended and retracted dependant upon the velocity of the ocean currents. Similar disadvantages exist with the power plant disclosed in US Patent No. 5,440,176 as with the apparatus disclosed in US Patent No. 4,335,319.

US Patent No. 6,109,863 discloses a fully submersible apparatus for generating electricity. The apparatus includes a buoyant structure having a motor mounted thereto. A series of vanes are connected to the motor. The vanes are rotated by the ocean current to cause electricity to be generated. A disadvantage with this apparatus is that the generation of electricity is dependant upon the area of current that the vanes are able to capture.

US Patent No. 4,313,059 discloses a system for generating electricity from ocean currents. The system uses two drags that are connected to opposite ends of a cable. The middle of the cable is wrapped around a generator. The drags are lowered into the ocean and moved from a drag position to a non-drag position to recprocate movement of the cable. The disadvantage with this system is that the generator must be able to generate energy when rotated in both directions. Further, the energy supply is not constant as the generator is constantly changing directions.

GB Patent Application 2,214,239A discloses an apparatus for harnessing power from natural fluid flows. The apparatus includes a continuous belt having a number of vanes. The continuous belt encircles a pair of cylinders that are operatively connected to drive a generator. The continuous belt is orientated so that water flow across the vanes to drive the belt and hence rotate the cylinders. The problem with this apparatus is that water flows through a front set of vanes and then through a rear set of vanes on the continuous belt. This creates water turbulence in water that passes through the rear set of vanes and hence efficiency of the apparatus is reduced.

OBJECT OF THE INVENTION

It is an object of the invention to overcome or alleviate at least one or more of the above disadvantages or provide the consumer with a useful or commercial choice.

DISCLOSURE OF THE INVENTION

In one form, although it need not be the only or indeed the broadest form, the invention resides in an underwater power generation system comprising:

- 5 at least one continuous track;
- a plurality of carriages that are movable around said track;
- at least one foil attached to each of the carriages, said foils able to be driven by a water current;
- at least one line member connected to the carriages;
- 10 at least one power take-off operatively connected to said line member;
- wherein the driven foils cause the carriages to move around said track and hence cause movement of said line member to power said power take-off.

The at least one foil rotates substantially within a plane that is substantially perpendicular to flow of water current.

- 15 The power take-off may be operatively connected to a pump or generator or the like device.

Further features of the present invention will become apparent from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

- 20 To assist in understanding the invention and to enable a person skilled in the art to put the invention into practical, an embodiment of the invention will be described by way of example only with reference to the accompanying drawings, wherein:

- 25 FIG. 1 shows a top view of an underwater power generation system according to a first embodiment of the present invention;

FIG. 2 shows front view of the underwater power generation system of FIG. 1;

FIG. 3 shows a side sectional view of the underwater power generation system of FIG. 1;

- 30 FIG. 4 shows a side sectional view of the underwater power generation system of FIG. 1;

FIG. 5 shows a top view of a track shown in FIG. 1;

FIG. 6 shows a cross-sectional view of the track along the line A-A;

9 8

A

FIG. 7 shows a cross-sectional view of the track along the line B-B;

FIG. 8 shows a top view of a wing reinforcement plate and a connection arm;

5 FIG. 9 shows a front view of the wing reinforcement plate and a connection arm shown in FIG. 8;

FIG. 10 shows a side view of the connection arm of FIG. 8;

FIG. 11 shows a front view of a foil carriage assembly;

FIG. 12 shows a top view of the foil carriage assembly of FIG. 11;

FIG. 13 shows a side view of the foil carriage assembly of FIG. 11;

10 FIG. 14 shows a bottom view of the foil carriage assembly of FIG. 11;

FIG. 15 shows a front detailed view of the power take-off of the underwater power generation system;

15 FIG. 16 shows a detailed sectional view of the power take-off of the underwater power generation system;

FIG. 17 shows a detailed side section view of the underwater power generation system;

FIG. 18 shows a top view of an underwater power generation system according to a second embodiment of the present invention;

20 FIG. 19 shows front view of two drive units forming part of the underwater power generation system of FIG. 18;

FIG. 20 shows a side view of the underwater power generation system of FIG. 18;

25 FIG. 21 shows a top sectional view of the underwater power generation;

FIG. 22 shows a side sectional view of the underwater power generation system of FIG. 18;

FIG. 23 is a perspective view of a foil carriage assembly with foil mounted to a track;

30 FIG. 24 is a further perspective view of a foil carriage assembly with foil mounted to a track;

FIG. 25 a front view of a foil carriage assembly with foil mounted to a track;

FIG. 26 a rear view of a foil carriage assembly with foil mounted to a track;

FIG. 27 is a top sectional view of a foil carriage assembly mounted to a track according to FIG. 25;

5 FIG. 28 is a side sectional view of a foil carriage assembly mounted to a track according to FIG. 25;

FIG. 29 is a top view of an anchored power generation system of FIG. 18;

10 FIG. 30 is a side view of the anchored power generation system of FIG. 18;

FIG. 31 is a sectional side view of a cable;

FIG. 32 is a top view of an anchored power generation system with funnel;

15 FIG. 33 is a side view of the anchored power generation system with funnel; and

FIG. 34 is a front view of an anchored power generation system with funnel.

DETAILED DESCRIPTION OF THE INVENTION

20 FIGS. 1 to 4 show an underwater power generation system 10 that uses water currents to produce electricity. The underwater power generation system 10 includes a frame 20, a track 30, a plurality of foils 40 and a power take-off 50.

25 The frame 20 is formed from a main cylindrical body 21 with two arcuate attachment arms 22. Main cylindrical body 21 is hollow and has a centre fin 23 that extends rearwardly from the main cylindrical body 21. Side fins 24 are located at the sides of the main cylindrical body 21.

30 The arcuate arms 22 are used to hold the underwater power generation system 10. Cables (not shown) are attached to ends of each of the arcuate arms 22 and are anchored to an ocean or river floor to hold the underwater power generation system in position. Alternatively, the cables are mounted to a bridge, boat, or the like structure.

Track support members 25 are attached and extend outwardly from the main cylindrical body 21. The track support members 25 are used to

mount the track 30. Each track support member 25 is formed from a track arm 26 and a track cradle 27, details of which are shown in FIG. 17. Two bolt holes 28 are located through the cradle to attach the track to the cradle 27.

The track 30, shown in more detail in FIGS. 5 to 7, is oval in shape.
5 The track 30 is formed from two side track plates 31, a bottom track plate 32 and two L-shaped joining plates 33. The track 30, in transverse cross-section, is a rectangular-shaped channel.

Each of the foils 40 is formed from two wings 41, shown in FIG. 17, and a connection arm 42. The two wings 41 are rearwardly splayed with respect to each other and are inclined downwardly with respect to the connection arm 42. The wings 41 are formed from fibre-glass and are of a tear-drop shape when viewed in transverse cross-section.
10

Each wing has a wing reinforcement plate 43, shown in FIGS. 8 and 9, that extends through the centre of the wing 41. The foil connection arm 42, shown in FIGS. 8, 9 and 10, is formed from a foil connection 44 plate and two inclined connection wing plates 45. The connection wing plates 45 are used to mount respective reinforcement plates 43. Fibreglass is moulded around the reinforcement plates 43, connection wing plates 45 and the top of the foil connection plate 44 to produce the foil and associated wings. A series of holes 46 are located through the foil connection plate 44. The holes 46 are used to mount the foil at a desired angle with respect to foil carriage assembly 60.
15
20

The foil carriage assembly 60, shown in detail in FIGS. 11 to 14, is formed from a chain support member 70, two top wheel assemblies 80 and two bottom wheel assemblies 90. The chain support member 70 is formed from a C-shaped channel. A carriage connection plate 71 is attached to and extends upwardly from the chain support member 70.
25

Each of the top wheel assemblies 80 is formed from a top shaft 81 having two top wheels 82 mounted for rotation adjacent opposite ends of the top shaft 81. Each of the top wheels 82 has a wheel channel 83 located within the top wheel. Washers 84 are located between the top wheels 82 and the top shaft 81. The carriage connection plate 71 is used to mount each top shaft. Each top shaft is pivotally mounted to the carriage connection plate 71 via an attachment pin 85.
30

Each of the bottom wheel assemblies 90 are formed from a bottom shaft 91 having a bottom wheel 92 mounted for rotation adjacent the end of the bottom shaft. The bottom wheel 92 is a flat wheel. The chain support member 70 is used to mount the bottom shaft 92. Washers 93 are located between the bottom wheels 92 and the bottom shaft 91, and the bottom shaft 92 and the chain support member 70.

A chain mounting member 73 is connected to the chain support member 70. The chain support member is connected to a drive chain 74. The drive chain 74 extends the periphery of the track 30.

In use, the wheel channels of the top wheels are placed on top of the side track plates 31 to allow the foil carriage assembly 60 to run along the top of the channel 30. The bottom wheels 92 run smoothly along the inside of the channel 30. The bottom wheels 92 are held within the channel by a lubricating strip 75 and prevent the top wheels from becoming derailed from the channel 30. The top shafts 81 pivot as the foil carriage assembly 60 moves around the arcuate section of the track 30. FIG. 18 shows the shafts 81 pivoting as the foil carriage assembly 60 moves around the arcuate sections of the track 30.

The power take-off 50 shown in FIGS. 15 and 16 includes a main gear 51 mounted to a main gear shaft 52. The main gear shaft 52 is mounted via the track 30 and the main cylindrical body 21. The main gear shaft 52 is mounted adjacent the middle of the arcuate section of the track. The main gear 51 engages the drive chain 74 and is driven by the drive chain 74 as the foil carriage assembly 60 moves around the track 30. The power take-off 50 also includes a bottom gear 53 which is attached to the opposite end of the main gear shaft 52 to that of the main gear 81. The bottom gear 53 is located within the centre fin 23.

A speed increase assembly 100 is located adjacent the power take-off. The speed increase assembly 100 includes a speed increase large gear 101 and a speed increase small gear 102, both of which are mounted to a speed increase shaft 103. The speed increase shaft 103 is mounted for rotation through the main cylindrical body 21. The speed increase gears 101 and 102 are located within the centre fin 23. The speed increase small gear 102 is

substantially smaller than the bottom gear 53. The speed increase small gear 102 is connected to the bottom gear via a chain 104. The speed increase large gear 101 is the same size as the bottom gear.

Two pump assemblies 110 and 120 are located adjacent the speed increase assembly 100. Each pump assembly includes a respective pump gear 111 and 121 mounted to a respective pump shaft 112 and 122. Each respective pump shaft 112 and 122 is connected to and drives pumps 114 and 124. The first pump assembly 110 also includes a transfer gear 113 that is mounted to the pump shaft 112. The speed increase large gear 101 is connected to the first pump gear 111 via a chain 115. The transfer gear 113 is connected to the second pump gear 121 via a chain 125. Each pump is connected to a turbine (not shown).

The foils 40 are attached to the foil carriage assembly 60 using two foil attachment plates 47. The foils attachment plates 47 are connected to the foil connection plate 44 and the carriage connection plate 71. The angle of the foil 40 is able to be adjusted using the series of holes located in the foil connection plate 44. The angle of the foils is determined by numerous elements such as the velocity of the water and the direction of the water current.

In use, the underwater power generation system 10 is located within a water current so that the track 30 is substantially perpendicular to the water current. The water current acts on the foils 40 and cause the foils to drive the drive chain 74 around the track 30. The drive chain 74 in turn drives the main gear 51, main shaft 52 and bottom gear 53. The bottom gear 53 drives the speed increase large gear 101, speed increase small gear 102 and speed increase shaft 103. The rotational velocity of the speed increase large gear 101, speed increase small gear 102 and speed increase shaft 103 is substantially larger than that of the main gear 51, main shaft 52 and bottom gear 53.

The speed increase large gear 101 drives the first pump gear 111, first pump shaft 112 and transfer gear 113. The rotational velocity of the first pump gear 111, transfer gear 113 and first pump shaft 112 is substantially larger than that of the speed increase large gear 101, speed increase small gear 102 and speed increase shaft 103. The transfer gear drives the second pump gear 121 and second pump shaft 122. The pump shafts 112 and 122 drive their

respective pumps 114 and 124 which provided pressurised water to drive a turbine to create electricity.

The side fins 24 can be adjusted so that the rotation of the track 30 by the foils 40 does not cause destabilisation.

5 FIGS. 18 to 21 show an underwater power generation system 210 that uses water currents to produce electricity and also desalinate water. The underwater power generation system 210 includes a frame 220, a track 230, a plurality of foils 240 and power take-off 250.

10 The frame 220 is similar to that shown in the previous embodiment and is formed from a main body 221 having two arcuate attachment arms 222. Main body 221 is hollow and is shaped to reduce the drag cause by water flowing past the body. Side fins 224 are located at the sides of the main body 221. Tension cables 228 extend from the arcuate attachment arms 222 to the side fins 224 and the main body 221 to provide additional support. A nose 229
15 extends outwardly from the main body 221 to direct the water current over the foils 240.

Track support members 225 are attached and extend outwardly from the main body 221. The track support members 225 are used to mount the track 230. Each track support member 225 is formed from a track arm 226 and
20 a track cradle 227 similar to that shown in the previous embodiment. The track 230 again is oval in shape. The track 230 is formed from a single rotated T-shaped metal which is attached to the track cradle 227.

Each of the foils 240 is formed as described in the previous embodiment. Each foil 240 has two wings 241 and a connection arm 242. The
25 connection arm 242 has a foil connection 244 plate.

A foil carriage assembly 260, shown in detail in FIGS. 23 to 27, is formed from a foil carriage housing 270, two top wheel assemblies 280 and two bottom wheel assemblies 290. The foil carriage housing 270 is formed from a C-shaped channel. Foil attachment plates 247 extend upwardly from the foil
30 carriage housing. A drag reducing wing 271 covers a portion of the housing and reduces drag when the carriage passes through the water.

Each of the top wheel assemblies 280 is formed from a top shaft 281, a top wheel 282 and a top wheel pivot arm 283. The top wheel pivot arm

283 is L-shaped and is attached to the foil carriage housing 270 via a top wheel pivot arm pin 284. The top wheel pivot arm pin 284 allows the top wheel pivot arm 283 to pivot with respect to the foil carriage housing 270. The top shaft 282 extends outwardly from the top wheel pivot arm 283 and rotatably mounts the top wheel 282. Each of the top wheels 282 has a wheel channel 285 located within the top wheel 282.

Each of the bottom wheel assemblies 290 is formed from a bottom shaft 291, a bottom wheel 292 and a bottom wheel pivot arm 293. The bottom wheel pivot arm 293 is L-shaped and is attached to the foil carriage housing 270 via a bottom wheel pivot arm pin 294. The bottom wheel pivot arm pin 294 allows the bottom wheel pivot arm 293 to pivot with respect to the foil carriage housing 270. The bottom shaft 292 extends outwardly from the bottom wheel pivot arm 293 and rotatably mounts the bottom wheel 292. Each of the bottom wheels 292 has a wheel channel 295 located within the bottom wheel 292.

In use, the wheel channels 285 of the top wheels 282 are placed on top of the track 230 and the wheel channels 295 of the bottom wheels 292 are placed on the bottom of the track to allow the foil carriage assembly 260 to run along the top of the track 230. The top wheel pivot arm pins 284 and the bottom wheel pivot arm pins 294 pivot as the foil carriage assembly 260 moves around the arcuate section of the track 230. As in the previous embodiment, water acts on the foils 240 to drive the carriages around the track 230.

The power take-off 250 includes two main pulleys 251 which are mounted to respective main pulley shafts 252. A flat tooth belt extends 253 around the two main pulleys 251. The main pulley shafts 252 are mounted via the main body 221. Link arms 254 are attached to the flat tooth belt 253 and to the carriage housing 270. The main pulleys 251 are driven by the flat tooth belt 253 which in turn is driven by the foil carriage assemblies 260 via the link arms 254.

The main pulley shafts 252 are connected to respective secondary drive trains 300. Each secondary drive train drives an alternator shaft 301 that is connected to an alternator 310. A heat exchanger 311 is associated with the alternator 310 to ensure that overheating does not occur. The alternators 310

are connected to AC to DC inverters 330. The inverters 330 allow power to be transmitted efficiently into, for example, a power grid.

5 A sea water pump drive 320 is connected to the alternator shaft 302. The sea water pump drive 320 drives a sea water pump shaft that is connected to and drives a sea water pump 321. Salt water is pumped by the sea water pump through a desalinator (not shown) to provide fresh water.

10 The sea water pump 340 is also connected to a set of accumulators 350 located adjacent the side fins 224. The accumulators are used to pivot the side fins 224 via respective hydraulic ram (not shown). The accumulators 350 enable the side fins 224 to be adjacent without the need to operate the sea water pump 340 for small movements.

15 An air compressor and electric motor 360 is provided to adjust ballast within the main body 221. Blow valves 361 allow water to flow into and out of the main body 221 by adjusting the amount of air located within the main body 221 via the air compressor. A manifold 362 is used to control the flow of air provided by the air compressor to various sections of the main body 221.

20 Speed sensors 370 are at various locations on frame 220. The speed sensors 370 provide information on the speed of the water current. A PLC 380 provides a control strategy to control the flow of water into and out of the main body 221. Further, the PLC 380 controls the rotation of the side fins 224 via the accumulators 350.

25 In order to secure the frame 220 within a water current, cables are attached to ends of each of the arcuate arms 222 via anchor points as shown in FIGS. 29 and 30. The cables 390 are also anchored via an anchor 400 to an ocean or river floor to hold the underwater power generation system 210 in position. There are three types of cables. There is a lead cable 391 that extends from the anchor point, main cables 392 that carry a majority of the load and debris deflector cables 393 that assist in preventing large debris from hitting the foils 240 and damaging the underwater power generation system 210.

30 FIG. 31 shows a sectional view of the cables 390. Each of the cables 390 includes a core 394 that carries the load and cable foil 395 to reduce water drag. The cable foil 305 is able to rotate with respect to the core 394 so

that the cable foil is able to find a position of least drag with respect to the core 394 in water current.

5 An adjustment balloon 410 is attached at an end of the lead cable 392. The adjustment balloon 410 is attached to a snorkel 420 to enable air to be released from the balloon 410. Air is pumped into the balloon 410 from the air compressor 360 to inflate the balloon 410. Again, the PLC 380 controller controls the amount of air located within the balloon.

10 A GPS telemetry system 430, located adjacent the end of the snorkel 420, transmits operational details of the underwater power generation system 210 such as speed of the water current, the position of the frame 220 with respect to the water current and the speed of the foils to a land based operator. Further, the GPS telemetry receives operational instructions such as moving the frame 220 left or right and/or adjusting the height and turning the alternators and/or sea water pump on or off sent by a land based operator.

15 In use, the underwater power generation system 210 is located within a water current so that the track 230 is substantially perpendicular to the water current. The water current acts on the foils 240 and cause the foils to move around the track 230 and consequently drive the flat tooth belt 253. The flat tooth belt 253 in turn drives the main pulleys 251 and hence the alternators 310 and sea water pump 320.

20 Once the sea water pump 340 has commenced operation the accumulators 350 are filled to capacity so that the side fins 224 can be moved as desired. The PLC 380 receives feedback from the speed sensors and uses its control strategy to adjust the position of the frame to an optimum position within the water current. The position of the frame is changed by moving the side fins 224, adjusting the amount of water within the main body 221 and adjusting the amount of air within the balloon.

25 FIGS. 32 to 34 show a funnel 440 attached to an underwater power generation system 210. The funnel 440 is tapered with a larger end of the funnel 440 located furthest away from the frame 220 and a smaller end of the funnel located adjacent the foils 240. Water, as it passes through the funnel, increases in velocity and hence, in turn, the velocities of the foils 240 are also increased. This increases the output of the alternators 330 and the sea water pump 340.

The underwater power generation systems detailed above are environmentally friendly as they use natural water current to create electricity without the creation of any pollution. The electricity produced is a renewal energy source as water currents such as those found in rivers, oceans and created by the tides, occur frequently.

The underwater power generation systems all have foils that rotate in substantially in a single plane. The underwater power generation system is positioned so that the plane that the foils are located is perpendicular to the flow of the water current. Hence, less turbulence is created as the foils are propelled by the water at the same instant resulting in increased efficiency. A further advantage of the pathway being perpendicular to the flow of water current is that the foils always provide a drive to the line member as they pass along the entire pathway.

It should be appreciated that various changes and modification may be made to the embodiment described without departing from the spirit or scope of the invention.

CLAIMS:

1. An underwater power generation system comprising:
at least one continuous track;
a plurality of carriages that are movable around said track;
5 at least one foil attached to each of the carriages, said foils able to be driven by a water current;
at least one line member connected to the carriages;
at least one power take-off operatively connected to said line member;
wherein the driven foils cause the carriages to move around said track
10 and hence cause movement of said line member to power said power take-off.
2. The underwater power generation system of claim 1 wherein at least one foil rotates substantially within a plane that is substantially perpendicular to flow of water current.
3. The underwater power generation system of claim 1 wherein the power
15 take-off is operatively connected to a pump or generator or the like device.
4. The underwater power generation system of claim 1 wherein the track is mounted to a frame.
5. The underwater power generation system of claim 4 wherein the frame includes a main cylindrical body, two arcuate arms and track supports.
- 20 6. The underwater power generation system of claim 5 wherein each track support includes a track arm and a track cradle.
7. The underwater power generation system of claim 1 wherein the track is formed from two side track plates, a bottom track plate and two joining plates.
8. The underwater power generation system wherein each foil is formed
25 from two wings and a connection arm.
9. The underwater power generation system of claim 1 wherein each carriage is formed from a line support member, at least one top wheel assembly and at least one bottom wheel assembly.
10. The underwater power generation system of claim 1 wherein each foil is
30 pivotally mounted to its respective carriage.
11. The underwater power generation system of claim 1 further including a speed increase assembly and at least one pump assembly, both driven by the line member.

20 10

12. The underwater power generation system of claim 1 wherein the line member is a chain.

13. The underwater power generation system of claim 5 further including an air compressor and electric motor to adjust ballast within the main body.

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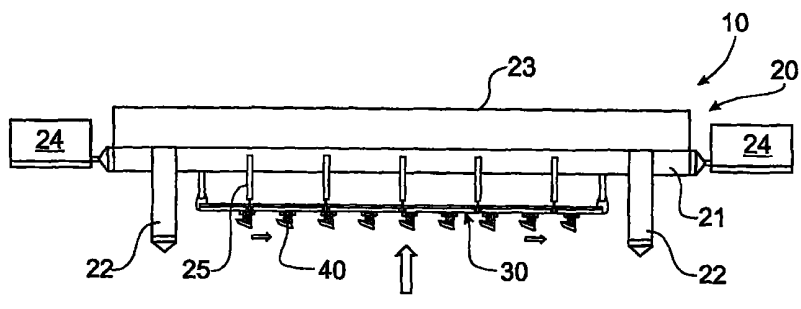


FIG. 1

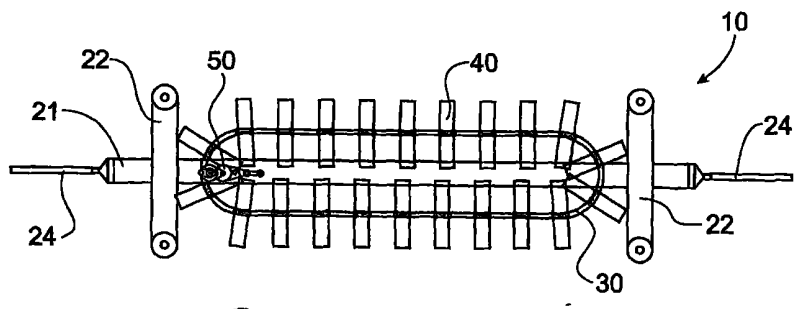


FIG. 2

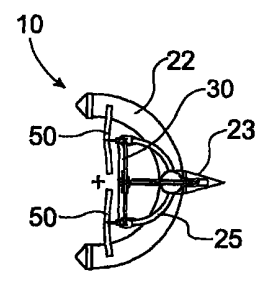


FIG. 3

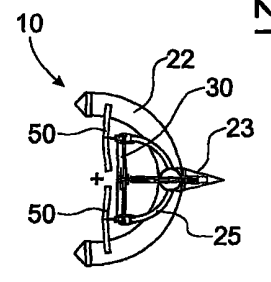
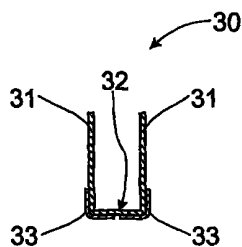
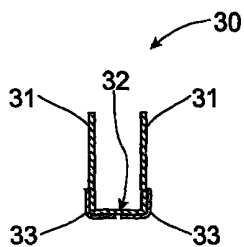
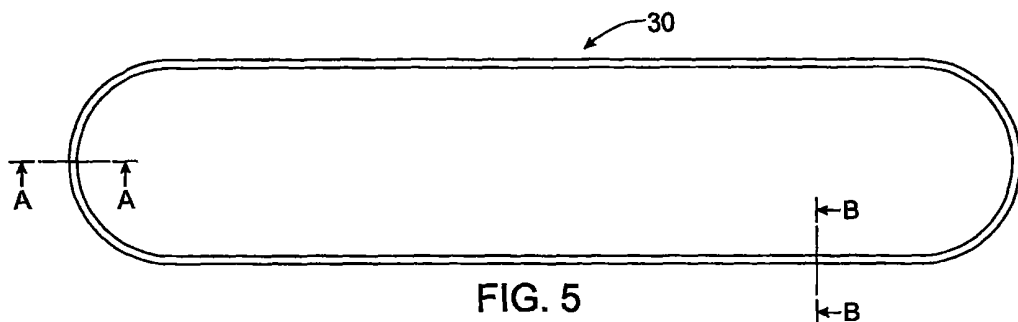


FIG. 4

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(B)

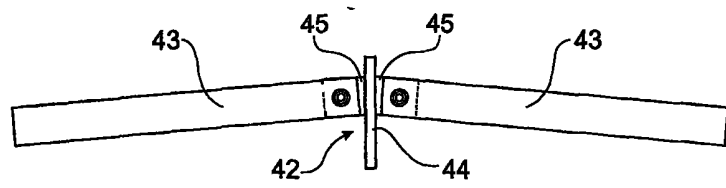


FIG. 8

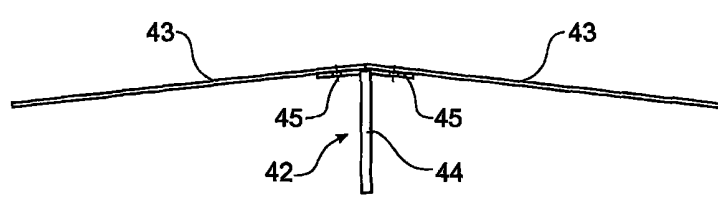


FIG. 9

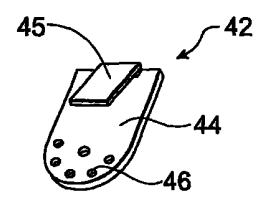


FIG. 10

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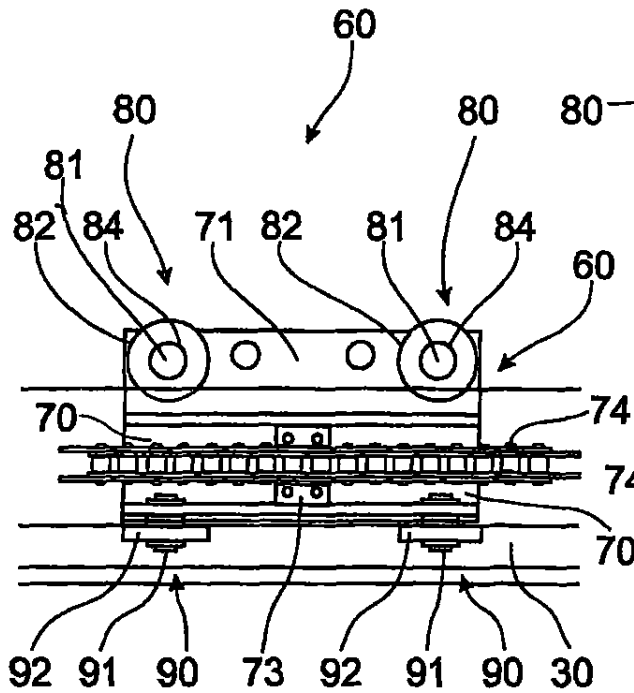


FIG. 11

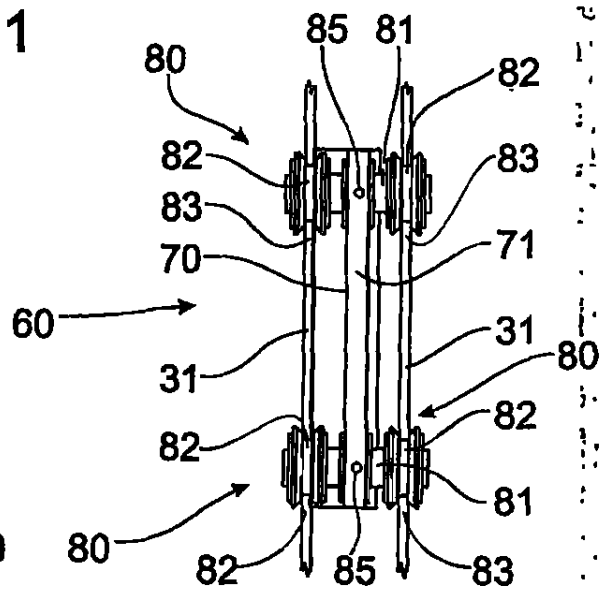


FIG. 12

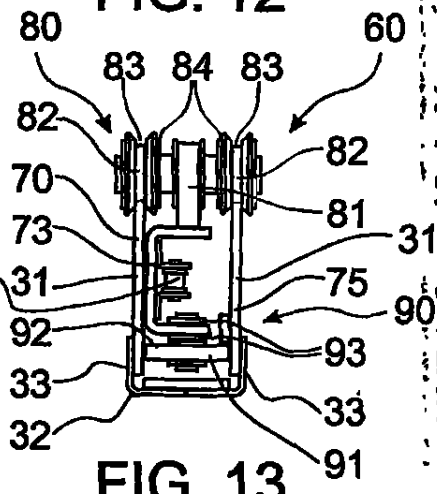


FIG. 13

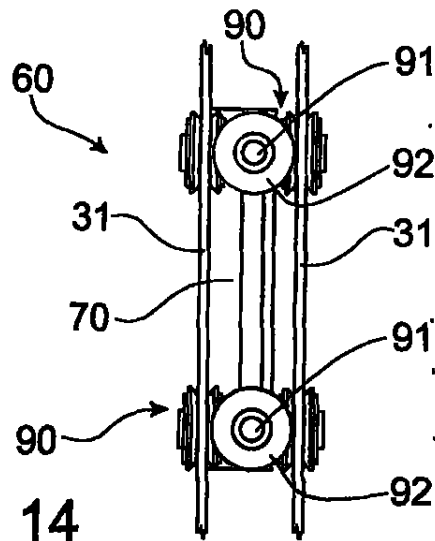
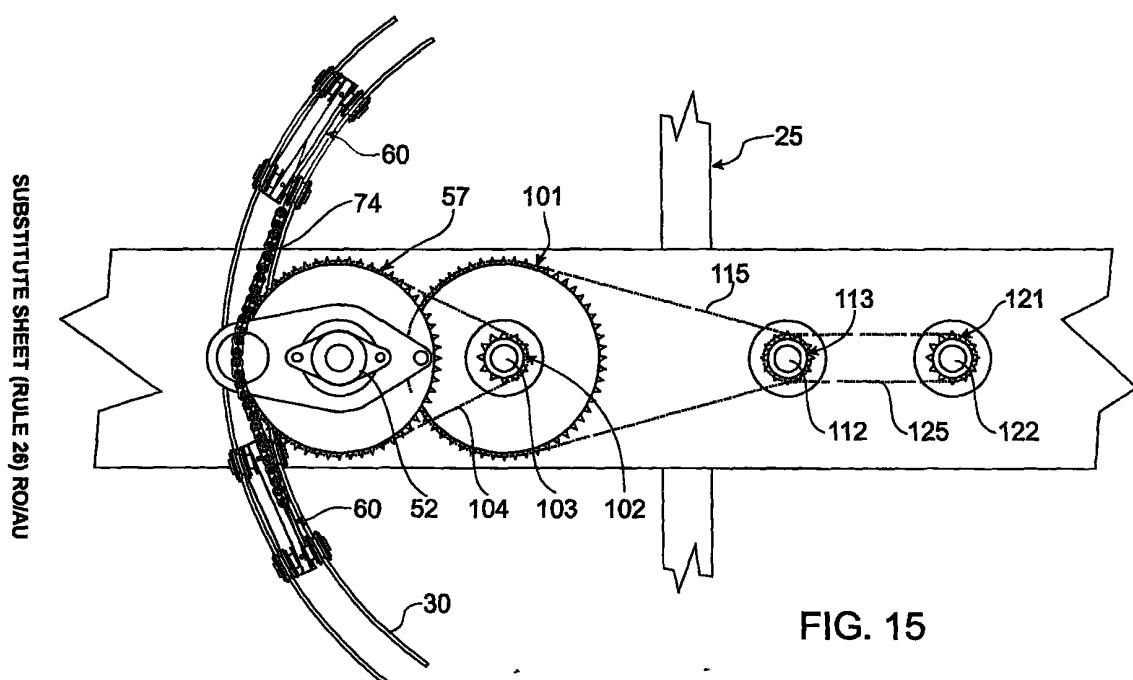
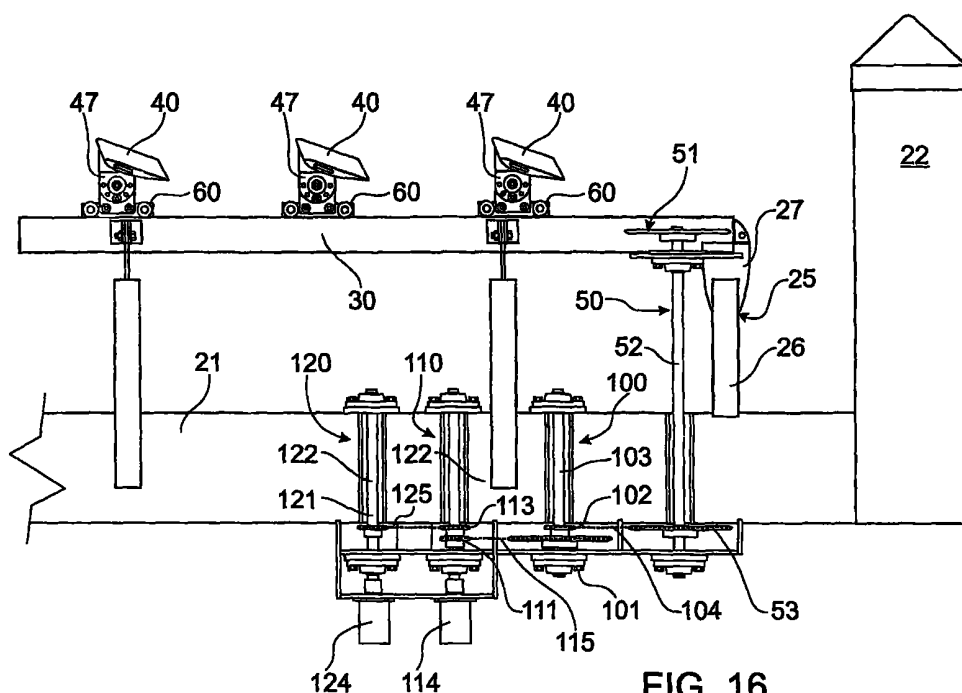


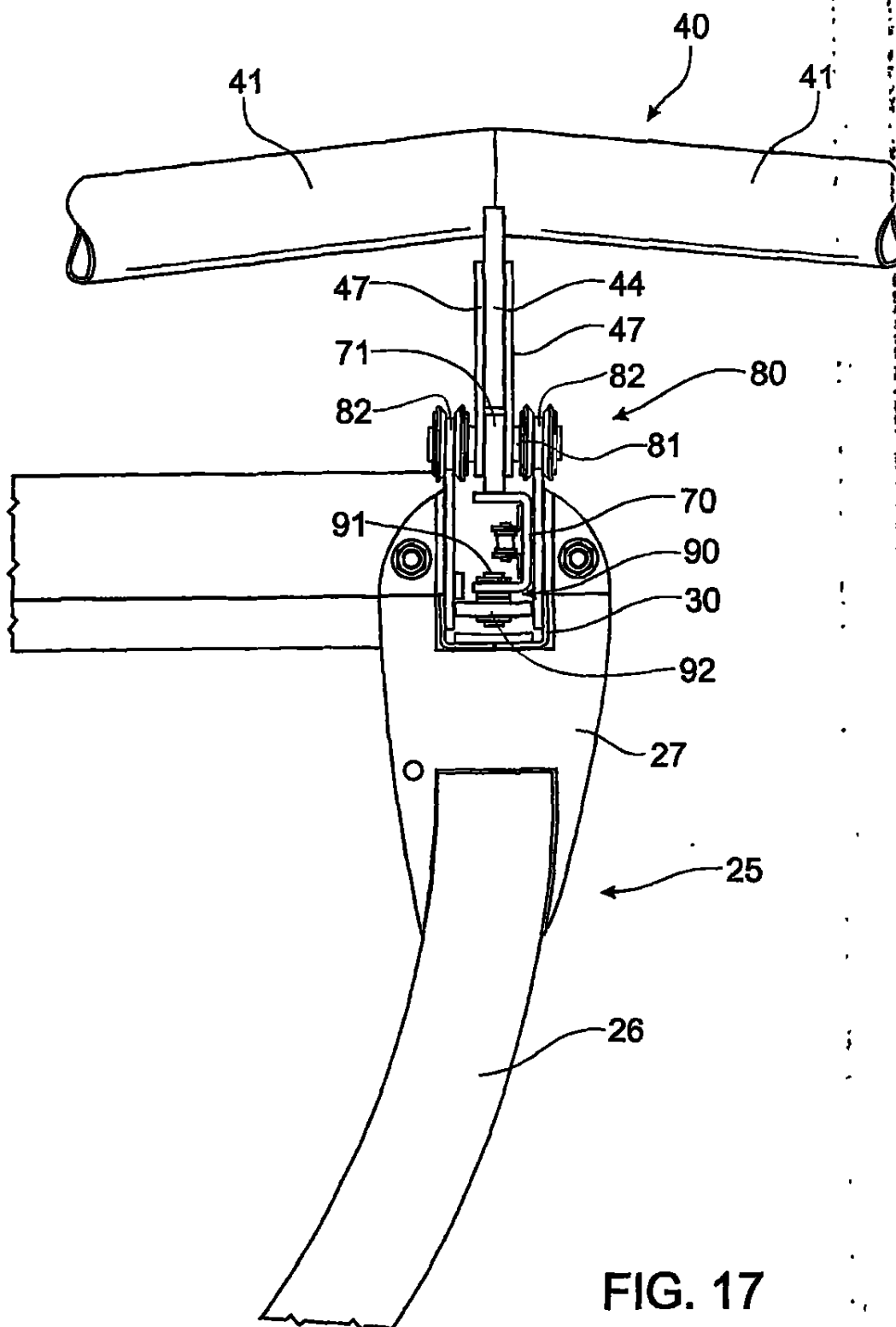
FIG. 14



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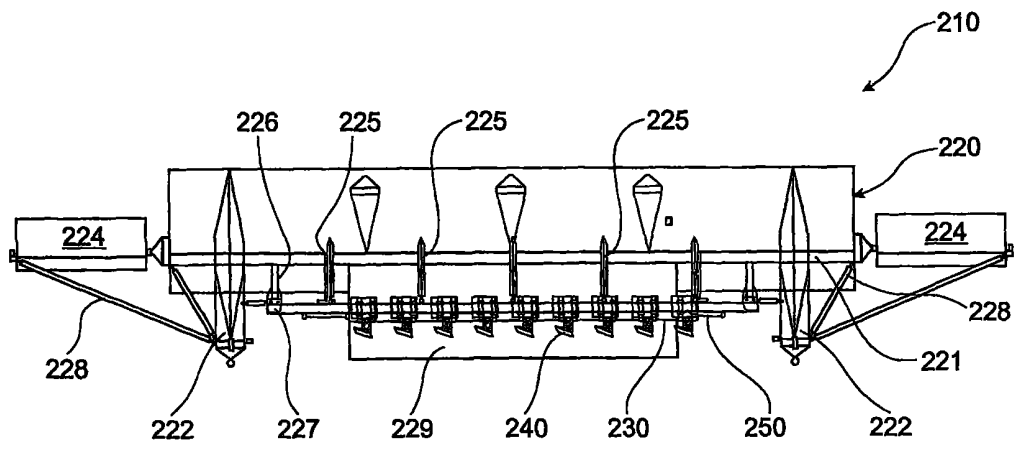


FIG. 18

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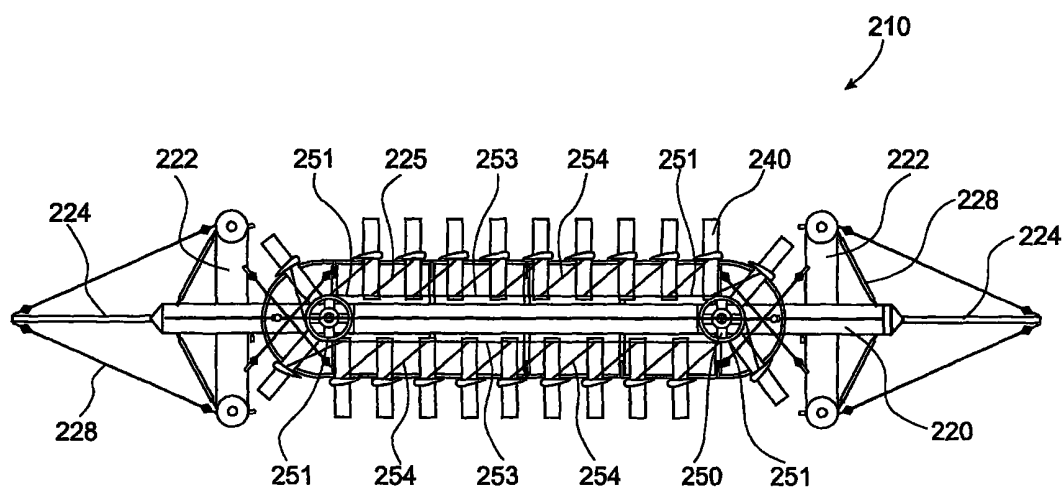
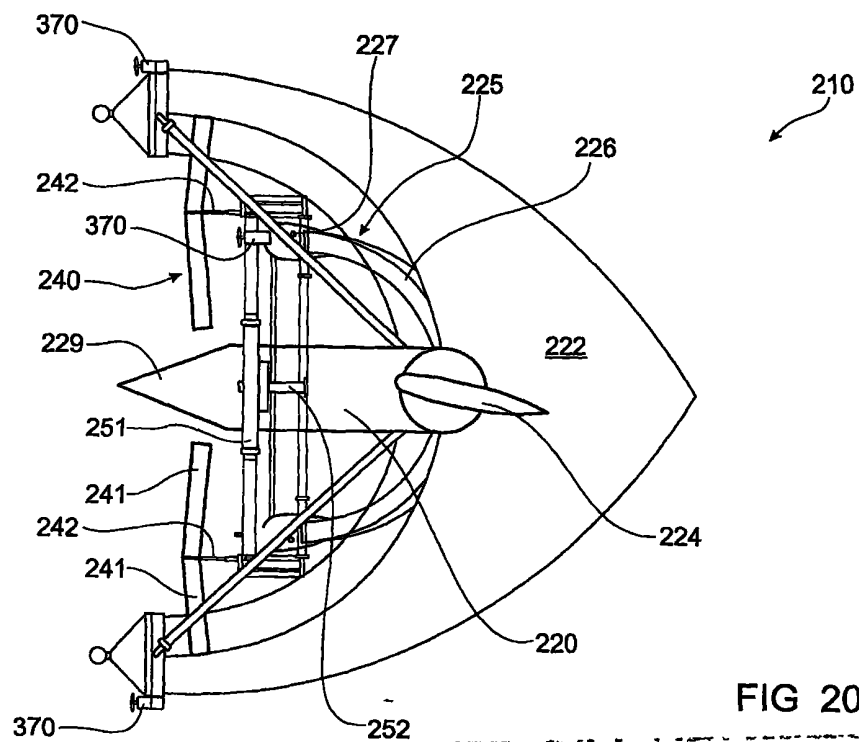


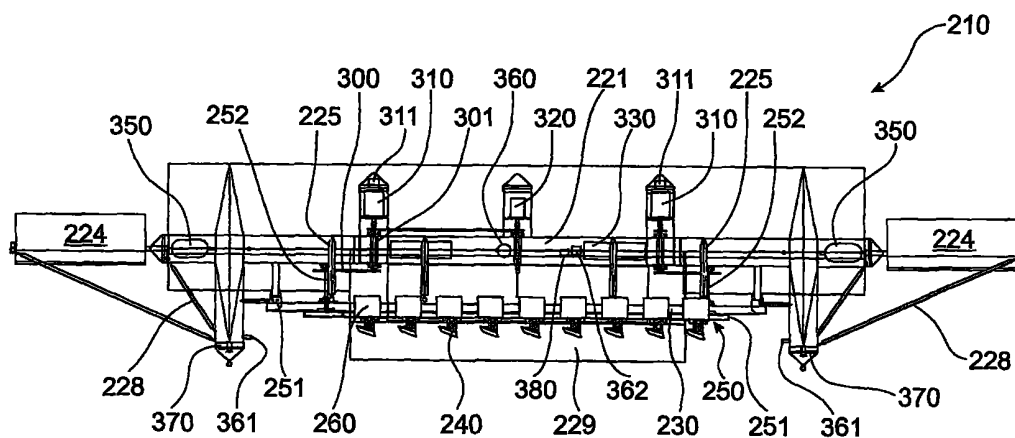
FIG. 19

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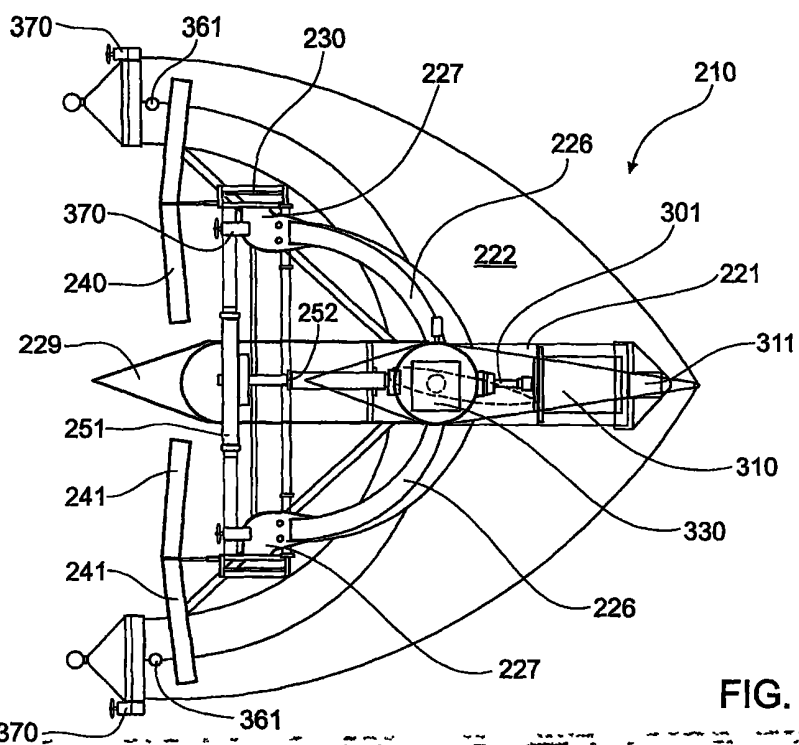


FIG. 22

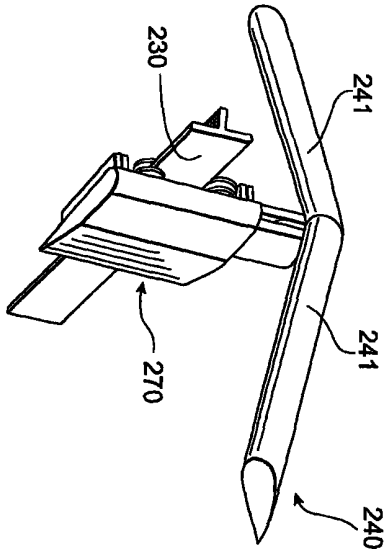


FIG. 23

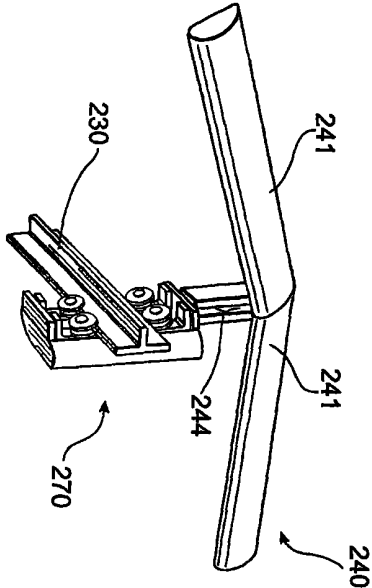


FIG. 24

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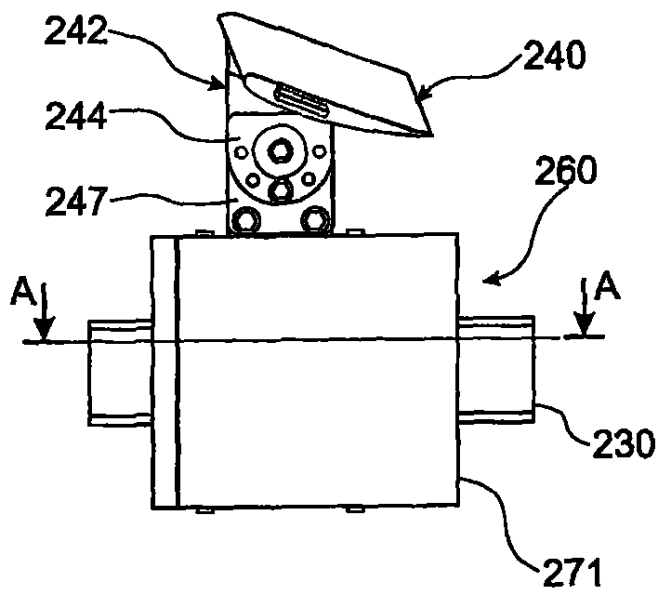


FIG. 25

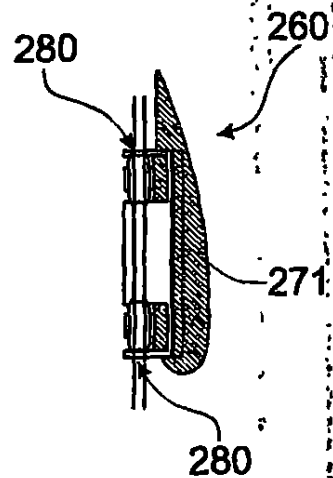


FIG. 27

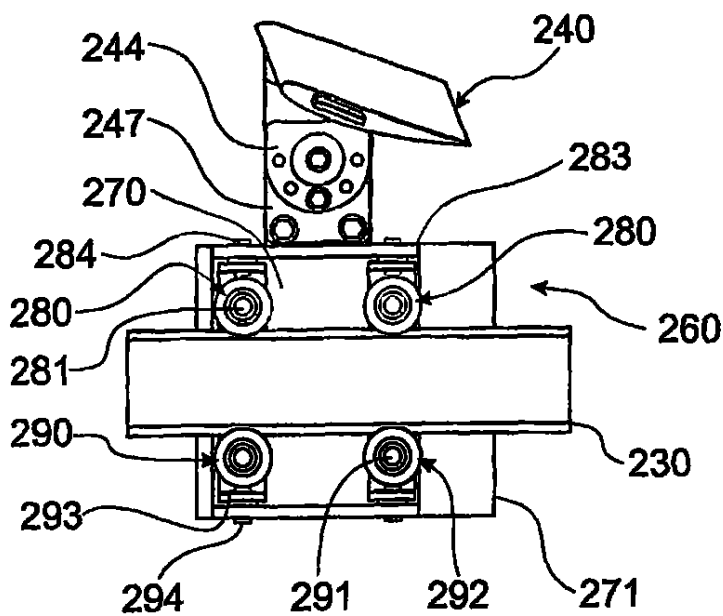


FIG. 26

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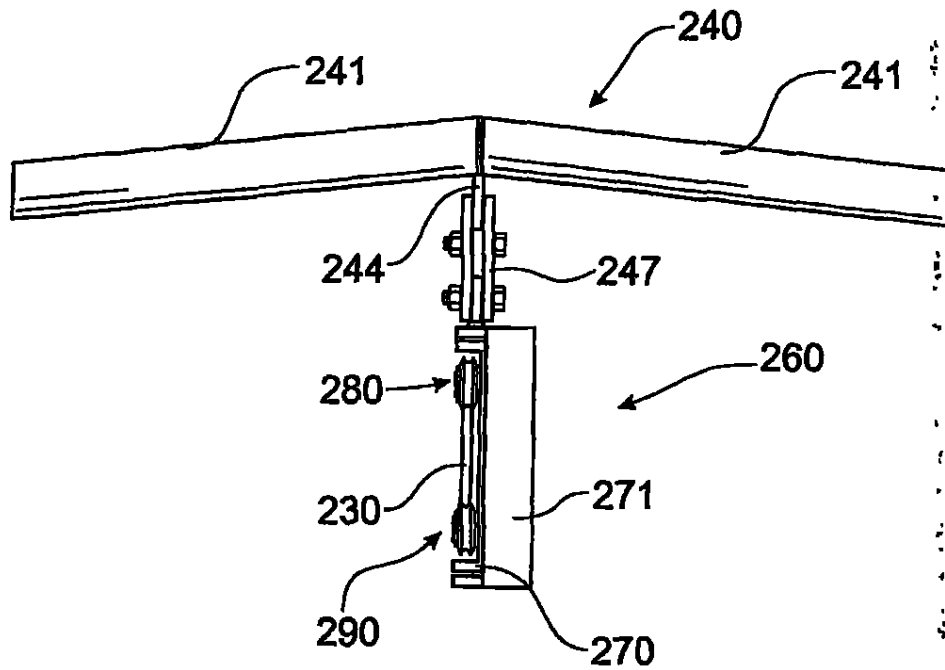


FIG. 28

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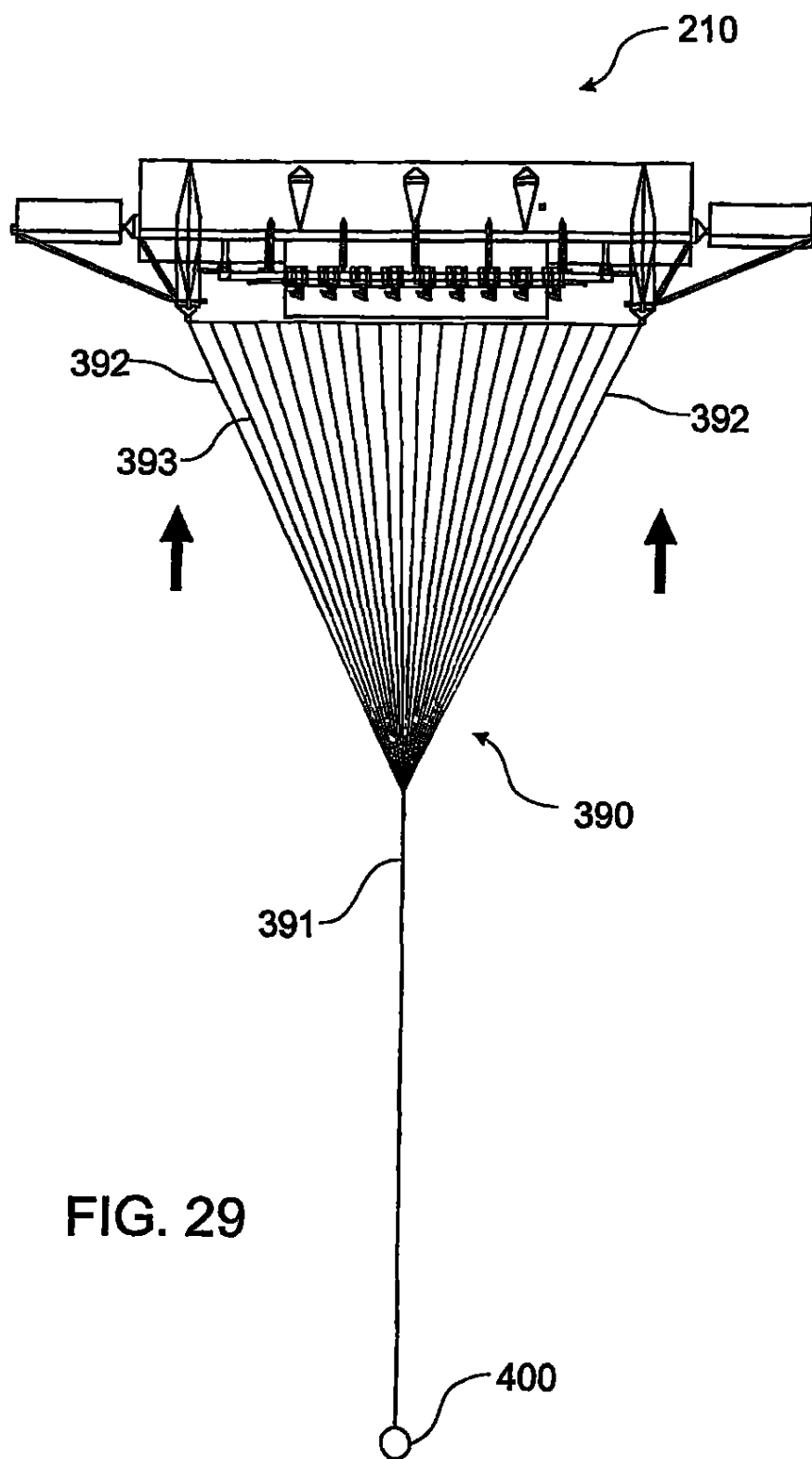


FIG. 29

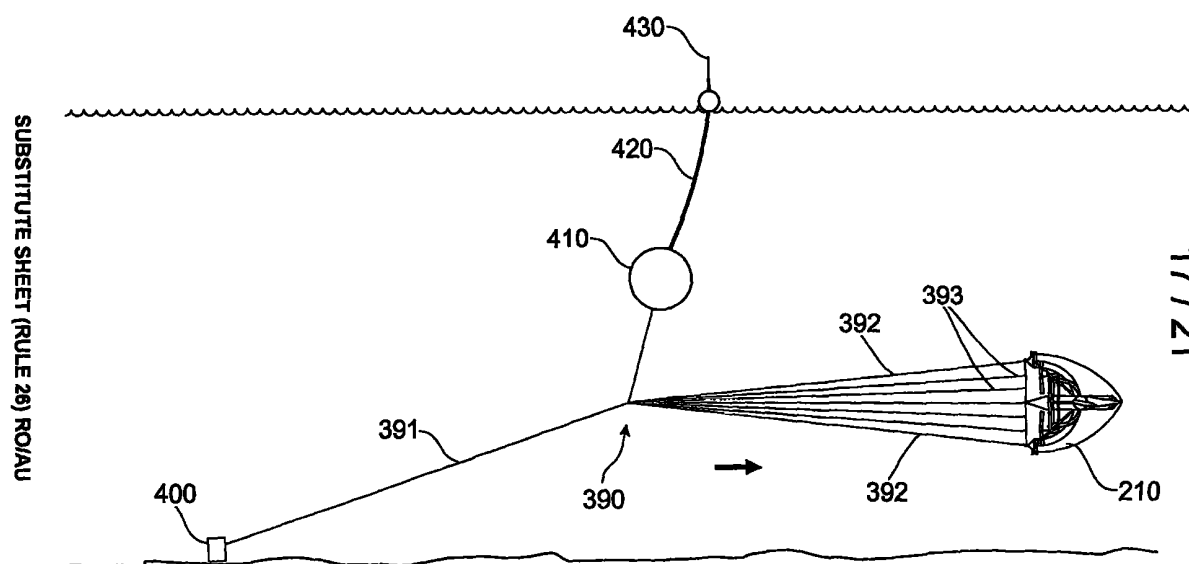


FIG. 30

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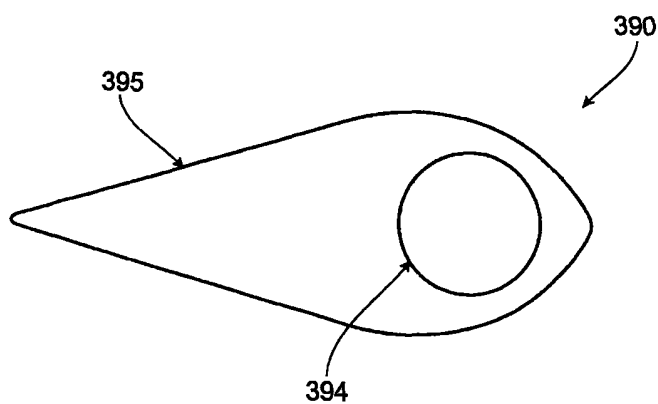


FIG. 31

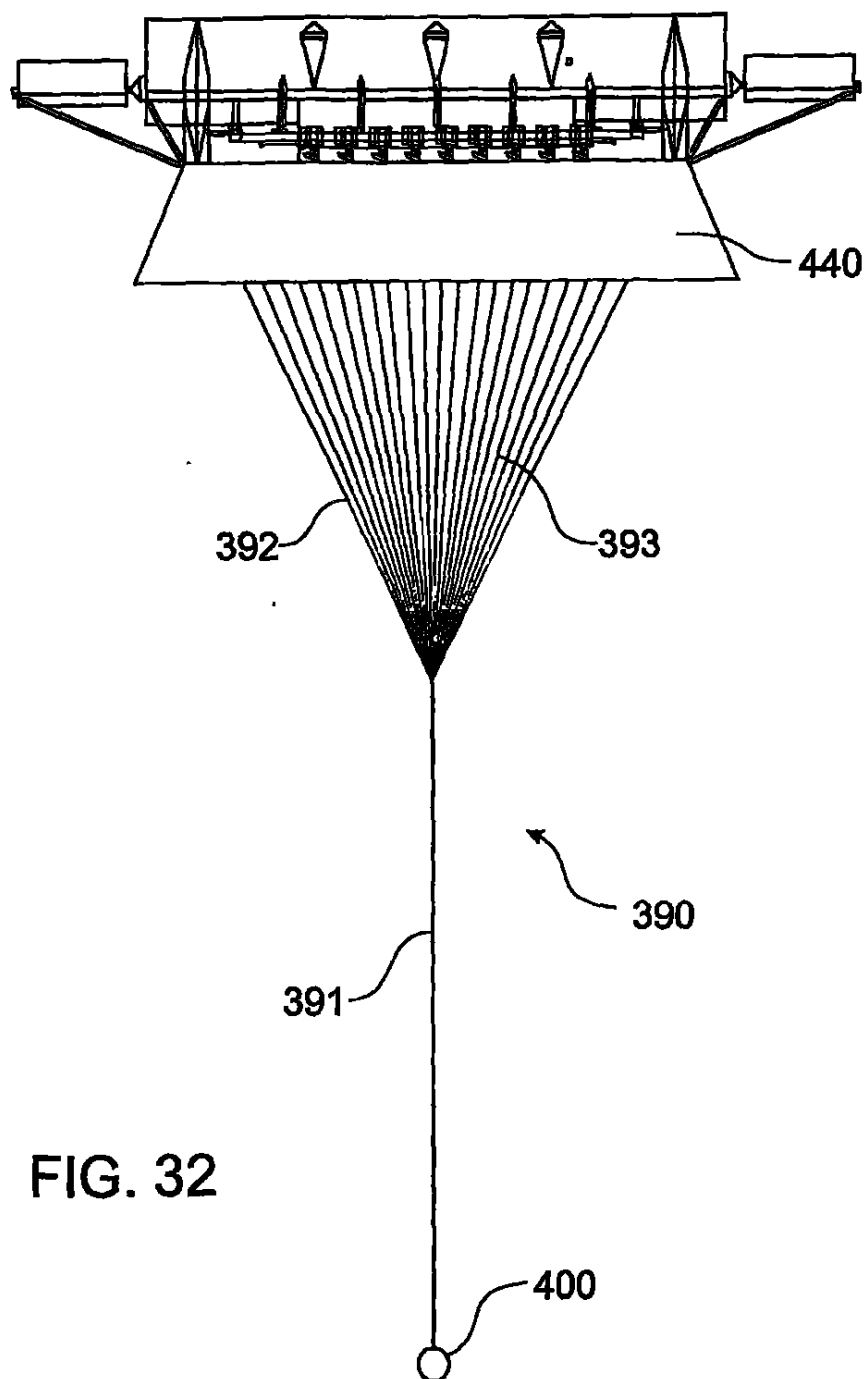


FIG. 32

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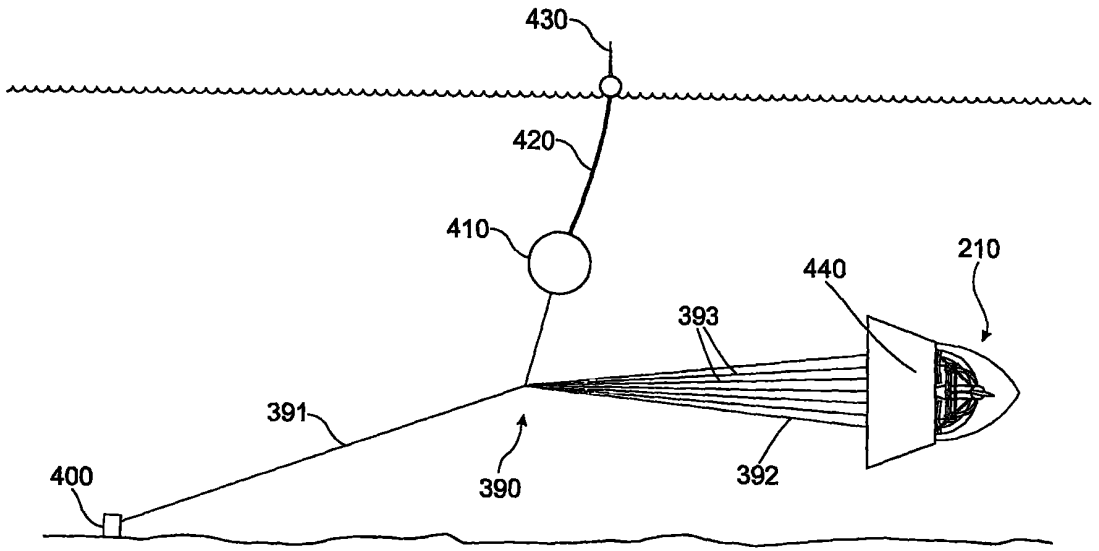


FIG 33

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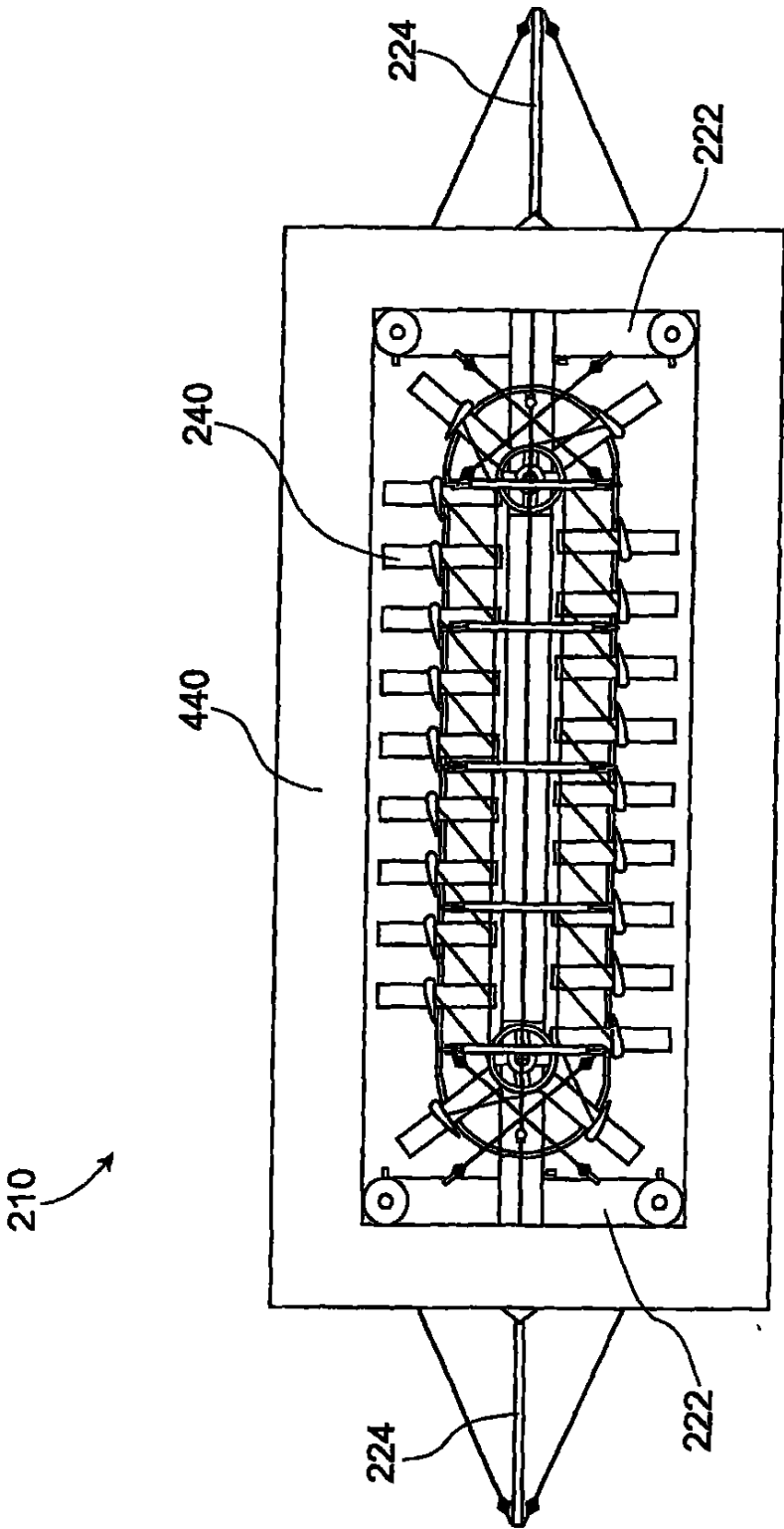


FIG. 34

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/000779

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ F03B 13/10, 13/12, 13/26		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI, F03B 13/10, 13/12, 13/26, 9/00, 13/00, 17/00 H02B 9/08, 9/02, key words PADDLE+, BLAD+, PERPENDIC+, TRANSVERS+, CURRENT+, FLOW+, RIVER+, STRAM+, WATER+, OCEAN+, STREAM+, POWER+, TURBIN+, ELECTRICITY+, GENERAT+, UNDERWATER+, BELT+, CONVEY+, CHAIN+, ENDLESS+		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2214239 A (MORGAN) 31 August 1989 Whole document	1-13
A	FR 2474106 A (GARIDEL) 24 July 1981 Whole document	1-13
A	DE 20312364 U (IWANEK) 9 October 2003 Whole document	1-13
☐ Further documents are listed in the continuation of Box C ☒ See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Z" document member of the same patent family		
Date of the actual completion of the international search 12 July 2005		Date of mailing of the international search report 21 JUL 2005
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6283 3929		Authorized officer SARAVANAMUTHU PONNAMPALAM Telephone No : (02) 6283 2070

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/000779

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
GB	2214239	IN	171965
FR	2474106	NONE	
DE	20312364	NONE	
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			
END OF ANNEX			

44

1

UN SISTEMA DE GENERACIÓN DE ENERGÍA SUBACUÁTICA

CAMPO DE LA INVENCION

5 La invención se refiere a un sistema de generación de energía subacuática. En particular, aunque no exclusivamente, la invención se refiere a un sistema de convertir energía cinética de agua en movimiento a energía eléctrica.

10

ANTECEDENTES DE LA INVENCION

 La generación de energía limpia se ha vuelto un interés principal debido a los efectos del calentamiento global. La generación de energía limpia renovable ha sido desarrollada utilizando celdas solares, turbinas de viento y turbinas de olas. No obstante, un sistema efectivo de generación de energía renovable no ha sido todavía desarrollado utilizando corrientes oceánicas.

20 La Patente de los Estados Unidos No. 4,383,182 describe un aparato para generar energía a partir de las corrientes oceánicas. El aparato cuenta con alas o álabes y está anclado al piso oceánico. Un número de precursores está acoplado al ala y son girados por la corriente

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oceánica. La rotación de los propulsores provoca la rotación de un generador para generar electricidad. El problema con este aparato es que el aparato no es fácilmente movido para abastecer los cambios en la dirección de corrientes oceánicas. Además, la generación de energía es dependiente del tamaño y número de propulsores para atrapar un área específica de flujo de corriente.

La Patente de los Estados Unidos No. 4,163,904 describe una planta de turbina subacuática para generar energía eléctrica utilizando las corrientes oceánicas. La turbina es impulsada por el flujo de la corriente de agua a través de la aspas de la turbina. Nuevamente, el nivel de electricidad generado es proporcional al área del agua que la planta de la turbina sea capaz de capturar.

La Patente de los Estados Unidos No. 4,335,319 describe un aparato de energía hidroeléctrica que incluye una casa de energía que contiene un generador de energía por arriba de la casa de energía, localizada por arriba de la superficie del agua. Una turbina hidráulica se hace descender desde la casa de energía cuando las corrientes oceánicas son suficientes para impulsar la turbina. La desventaja con este aparato es que se requiere energía para extender y retraer la turbina. Además, el área de

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corriente oceánica que es utilizada es equivalente al área de entrada de la turbina.

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La Patente de los Estados Unidos No. 5,440,176 describe una planta de energía hidroeléctrica similar a
5 aquella de la Patente de los Estados Unidos No. 4,335,319 en que una serie de turbinas son extendidas y retraídas dependiendo de la velocidad de las corrientes oceánicas. Existen desventajas similares con la planta de energía descrita en la Patente de los Estados Unidos No. 5,440,176
10 como con el aparato descrito en la Patente de los Estados Unidos No. 4,335,319.

La Patente de los Estados Unidos No. 6,109,863 describe un aparato completamente sumergible para generar electricidad. El aparato incluye una estructura boyante
15 que tiene un motor montado a ésta. Una serie de álabes están conectados al motor. Los álabes son hechos girar con la corriente oceánica para provocar que sea generada electricidad. Una desventaja con este aparato es que la generación de electricidad es dependiente del área de
20 corriente que los álabes son capaces de capturar.

La Patente de los Estados Unidos No. 4,313,059 describe un sistema para generar electricidad a partir de las corrientes oceánicas. El sistema utiliza dos dragas o rastras que están conectadas a extremos opuestos de un

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cable. La parte intermedia del cable está envuelta alrededor de un generador. Las rastras se hacen descender hacia el océano y son movidas desde una posición de arrastre hacia una posición de no arrastre para el movimiento alternante del cable. La desventaja con este sistema es que el generador debe ser capaz de generar energía cuando es rotado en ambas direcciones. Además, el suministro de energía no es constante ya que el generador está cambiando constantemente de direcciones.

10 La Solicitud de Patente Británica 2,214,239A describe un aparato para generar energía a partir de flujos de fluido naturales. El aparato incluye una banda continua que tiene un número de álabes. La banda continua rodea circularmente un par de cilindros que están operativamente
15 conectados para impulsar un generador. La banda continua es orientada de modo que el flujo de agua a través de los álabes impulsan la banda y por lo tanto hacen girar los cilindros. El problema con este aparato es que el agua fluye a través de un grupo frontal de álabes y luego a
20 través de un grupo posterior de álabes sobre la banda continua. Esto crea turbulencia de agua en el agua que pasa a través del grupo posterior de álabes y por lo tanto se reduce la eficiencia del aparato.

OBJETIVO DE LA INVENCION

Un objetivo de la invención es superar o aliviar al menos una o más de las desventajas anteriores o
5 proporcionar al consumidor una elección útil o comercial.

DESCRIPCION DE LA INVENCION

En una forma, aunque no necesite ser la única o por supuesto la forma más amplia, la invención radica en un
10 sistema subacuático de generación de energía que comprende:

al menos una guía de deslizamiento continua;

una pluralidad de carros que son movidos alrededor de la guía de deslizamiento;

al menos una lámina acoplada a cada uno de los
15 carros, las láminas son capaces de ser impulsadas por una corriente acuática;

al menos un miembro lineal conectado a los carros;

al menos una toma de energía operativamente
20 conectada al miembro lineal;

en donde las hojas o láminas impulsadas provocan que los carros se muevan alrededor de la guía de deslizamiento y por lo tanto provocan el movimiento del miembro lineal para energizar la toma de energía.

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Al menos una lámina rota sustancialmente dentro de un plano que está sustancialmente perpendicular al flujo de la corriente acuática.

La toma de energía puede ser operativamente
5 conectada a una bomba o generador o dispositivo similar.

Características adicionales de la presente invención se volverán aparentes a partir de la siguiente descripción detallada.

10 BREVE DESCRIPCIÓN DE LAS FIGURAS

Para ayudar a entender la invención y para hacer posible que una persona experta en la técnica ponga en práctica la invención, será descrita una modalidad de la invención a manera de ejemplo únicamente, con referencia a
15 los dibujos anexos, en donde:

La Figura 1 muestra una vista superior de un sistema subacuático de generación de energía de acuerdo a una primera modalidad de la presente invención;

La Figura 2 muestra una vista frontal del sistema
20 subacuático de generación de energía de la Figura 1;

La Figura 3 muestra una vista en sección lateral del sistema subacuático de generación de energía de la Figura 1;

La Figura 4 muestra una vista en sección lateral

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del sistema subacuático de generación de energía de la Figura 1;

La Figura 5 muestra una vista superior de una guía de deslizamiento mostrada en la Figura 1;

5 La Figura 6 muestra una vista en sección transversal de la guía de deslizamiento a lo largo de la línea A-A;

La Figura 7 muestra una vista en sección transversal de la guía de deslizamiento a lo largo de la
10 línea B-B;

La Figura 8 muestra una vista superior de una placa de reforzamiento de ala y un brazo de conexión;

La Figura 9 muestra una vista frontal de la placa de reforzamiento de ala y un brazo de conexión mostrado en
15 la Figura 8;

La Figura 10 muestra una vista lateral del brazo de conexión de la Figura 8;

La Figura 11 muestra una vista frontal de un montaje de carro de lámina;

20 La Figura 12 muestra una vista superior del montaje de carro de lámina de la Figura 11;

La Figura 13 muestra una vista lateral del montaje de carro de lámina de la Figura 11;

La Figura 14 muestra una vista inferior del

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montaje de carro de lámina de la Figura 11;

La Figura 15 muestra una vista frontal detallada de la toma de energía del sistema subacuático de generación de energía;

5 La Figura 16 muestra una vista seccional detallada de energía del sistema subacuático de generación de energía;

La Figura 17 muestra una vista en sección lateral detallada de energía del sistema subacuático de generación de energía;

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La Figura 18 muestra una vista superior de un sistema subacuático de generación de energía, de acuerdo a una segunda modalidad de la presente invención;

La Figura 19 muestra una vista frontal de dos unidades de impulsión que forman parte del sistema subacuático de generación de energía de la Figura 18;

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La Figura 20 muestra una vista lateral de un sistema subacuático de generación de energía de la Figura 18;

20 La Figura 21 muestra una vista seccional superior de la generación de energía subacuática;

La Figura 22 muestra una vista seccional lateral del sistema subacuático de generación de energía de la Figura 18;

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La Figura 23 es una vista en perspectiva de un montaje de carro de lámina con la lámina montada a una guía de deslizamiento;

La Figura 24 es una vista en perspectiva
5 adicional de un montaje de carro de lámina con la lámina montada a una guía de deslizamiento;

La Figura 25 es una vista frontal de un montaje de carro de lámina con la lámina montada a una guía de deslizamiento;

10 La Figura 26 es una vista posterior de un montaje de carro de lámina con la lámina montada a una guía de deslizamiento;

La Figura 27 es una vista seccional superior de un montaje de carro de lámina montado a una guía de
15 deslizamiento de acuerdo a la Figura 25;

La Figura 28 es una vista seccional lateral del montaje de carro de lámina montado a una guía de deslizamiento de acuerdo a la Figura 25;

La Figura 29 es una vista superior de un sistema
20 de generación de energía, anclado, de la Figura 18;

La Figura 30 es una vista lateral de un sistema de generación de energía, anclado, de la Figura 18;

La Figura 31 es una vista lateral seccional de un cable;

La Figura 32 es una vista superior de un sistema de generación de energía, anclado, con embudo;

La Figura 33 es una vista lateral del sistema de generación de energía, anclado con embudo; y

5 La Figura 34 es una vista frontal de un sistema de generación de energía, anclado, con embudo.

DESCRIPCIÓN DETALLADA DE LA INVENCION

Las Figuras 1 a la 4 muestran un sistema subacuático 10 de generación de energía que utiliza corrientes acuáticas para producir electricidad. El sistema subacuático 10 de generación de energía incluye una estructura o armazón 20, una guía de deslizamiento 30, una pluralidad de láminas 40 y una toma de energía 50.

15 La estructura 20 es formada a partir de un cuerpo cilíndrico principal 21 con dos brazos de acoplamiento arqueados 22. El cuerpo cilíndrico principal 21 está hueco y tiene una aleta central 23 que se extiende con dirección hacia atrás desde el cuerpo cilíndrico principal 21. Las
20 aletas laterales 24 están localizadas en los lados del cuerpo cilíndrico principal 21.

Los brazos arqueados 22 son utilizados para sujetar el sistema subacuático 10 de generación de energía. Los cables (no mostrados) son acoplados a los extremos de

cada uno de los brazos arqueados 22, y son anclados al piso de un océano o río para mantener en posición el sistema subacuático de generación de energía. Alternativamente, los cables son montados a un puente, bote o estructura similar.

Los miembros de soporte 25 de la guía de deslizamiento son acoplados y se extienden con dirección hacia afuera desde el cuerpo cilíndrico principal 21. Los miembros de soporte 25 de la guía de deslizamiento son utilizados para montar la guía de deslizamiento 30. Cada miembro 25 de soporte de guía de deslizamiento es formado a partir de un brazo 26 de guía de deslizamiento y un soporte 27 de la guía de deslizamiento, los detalles del cual se muestran en la Figura 17. Dos orificios 28 para perno están localizados a través del soporte para acoplar la guía de deslizamiento al soporte 27.

La guía de deslizamiento 30, mostrada con más detalle en las Figuras 5 a 7, es de forma oval. La guía de deslizamiento 30 es formada a partir de dos placas laterales 31 de guía de deslizamiento, una placa inferior 32 de guía de deslizamiento y dos placas 33 adjuntas, en forma de L. La guía de deslizamiento 30, en sección transversal, es un canal de forma rectangular.

Cada una de las láminas 40 es formada a partir de

dos alas 41, mostradas en la Figura 17, y un brazo de conexión 42. Las dos alas 41 son desplegadas con dirección hacia atrás una con respecto a la otra y están inclinadas con dirección hacia abajo con respecto al brazo de conexión 42. Las alas 41 son formadas a partir de fibra de vidrio y son en una forma de lágrima cuando son observadas en sección transversal.

Cada ala tiene una placa 43 de reforzamiento de ala, mostrada en las Figuras 8 y 9, que se extiende a través del centro del ala 41. El brazo de conexión 42 de lámina, mostrado en las Figuras 8, 9 y 10, es formado a partir de una placa de conexión 44 de lámina y dos placas 45 de ala, de conexión inclinadas. Las placas de conexión 45 de ala son utilizadas para montar las placas de reforzamiento 43, respectivas. La fibra de vidrio moldeada alrededor de las placas de reforzamiento 43, de las placas 45 de conexión de ala y la parte superior de la placa 44 de conexión de lámina, para producir la lámina y las alas asociadas. Una serie de orificios 46 están localizados a través de la placa 44 de conexión de lámina. Los orificios 46 son utilizados para montar la lámina a un ángulo deseado con respecto al montaje 60 de carro de lámina.

El montaje 60 de carro de lámina, mostrado con detalle en las Figuras 11 a 14, es formado a partir de un

miembro 70 de soporte de cadena, dos montajes 80 de rueda superior y dos montajes 90 de rueda inferior. El miembro 70 de soporte de cadena es formado a partir de un canal en forma de C. Una placa 71 de conexión de carro está
5 acoplada y se extiende con dirección hacia arriba desde el miembro 70 de soporte de cadena.

Cada uno de los montajes 80 de rueda superior es formado a partir de un eje superior 81 que tiene dos ruedas superiores 82 montadas para la rotación de los extremos
10 opuestos adyacentes del eje superior 81. Cada una de las ruedas superiores 82 tiene un canal de rueda 83 localizado dentro de la rueda superior. Las arandelas 84 están localizadas entre las ruedas superiores 82 y el eje superior 81. La placa 71 de conexión de carro es utilizada
15 para montar cada eje superior. Cada eje superior está pivotablemente montado a la placa 71 de conexión de carro por medio de una espiga de acoplamiento 85.

Cada uno de los montajes 90 de rueda inferior son formados a partir de un eje inferior 91 que tiene una rueda
20 inferior 92 montada para la rotación adyacente al extremo del eje inferior. La rueda inferior 92 es una rueda plana. El miembro 70 de soporte de cadena es utilizado para montar el eje inferior 92. Las arandelas 93 están localizadas entre las ruedas inferiores 92 y el eje

inferior 91, y el eje inferior 92 y el miembro 70 de soporte de cadena.

Un miembro 73 de montaje de cadena está conectado al miembro 70 de soporte de cadena. El miembro de soporte de cadena está conectado a una cadena de impulsión 74. La
5 cadena de impulsión 74 se extiende por la periferia de la guía de deslizamiento 30.

En el uso, los canales de rueda de las ruedas superiores están colocados sobre la parte superior de las
10 placas 31 de guía de deslizamiento lateral, para permitir que el montaje 60 de carro de lámina corra a lo largo de la parte superior del canal 30. Las ruedas inferiores 92 corren suavemente a lo largo de la parte interna del canal 30. Las ruedas inferiores 92 son mantenidas dentro del
15 canal por una tira de lubricación 75 y previene que las ruedas superiores se lleguen a descarrilar del canal 30. Los ejes superiores 81 pivotean conforme el montaje 60 de carro de lámina se mueve alrededor de la sección arqueada de la guía de deslizamiento 30. La Figura 18 muestra los
20 ejes 81 que pivotean conforme el montaje 60 de carro de lámina se mueve alrededor de las secciones arqueadas de la guía de deslizamiento 30.

La toma de energía 50 mostrada en las Figuras 15 y 16 incluye un engrane principal 51 montado a un eje 52 de

engrane principal. El eje 52 de engrane principal es montado vía la guía de deslizamiento 30 y el cuerpo cilíndrico principal 21. El eje 52 de engrane principal es montado adyacente a la parte intermedia de la sección arqueada de la guía de deslizamiento. El engrane principal 51 se acopla a la cadena de impulsión 74 y es impulsado por la cadena de impulsión 74 conforme el montaje 60 de carro de lámina se mueve alrededor de la guía de deslizamiento 30. La toma de energía 50 también incluye un engrane inferior 53 que está acoplado al extremo opuesto del eje 52 de engrane principal a aquel del engrane principal 81. El engrane inferior 53 está localizado dentro de la aleta central 23.

Un montaje 100 de incremento de velocidad está localizado adyacente a la toma de energía. El montaje 100 de incremento de velocidad incluye un engrane grande 101 de incremento de velocidad y un engrane pequeño 102 de incremento de velocidad, los cuales están montados a un eje 103 de incremento de velocidad. El eje 103 de incremento de velocidad está montado para la rotación a través del cuerpo cilíndrico principal 21. Los engranes 101 y 102 de incremento de velocidad están localizados dentro de la aleta central 23. El engrane pequeño 102 de incremento de velocidad es sustancialmente más pequeño que el engrane

inferior 53. El engrane pequeño 102 de incremento de velocidad está conectado al engrane inferior vía una cadena 104. El engrane grande 101 de incremento de velocidad es del mismo tamaño que el engrane inferior.

5 Dos montajes de bomba 110 y 120 están localizados adyacentes al montaje 100 del montaje de velocidad. Cada montaje de bomba incluye un engrane de bomba respectivo 111 y 121 montado a un eje de bomba respectivo 112 y 122. Cada eje de bomba respectivo 112 y 122 está conectado a e
10 impulsa las bombas 114 y 124. El primer montaje de bomba 110 también incluye un engrane de transferencia 113 que está montado al eje 112 de la bomba. El engrane grande 101 de incremento de velocidad está conectado al primer engrane 111 de bomba vía una cadena 115. El engrane de
15 transferencia 113 está conectado al segundo engrane 121 de bomba por medio de una cadena 125. Cada bomba está conectada a una turbina (no mostrada).

Las láminas 40 están acopladas al montaje 60 de carro de lámina utilizando dos placas 47 de acoplamiento de
20 lámina. Las placas 47 de acoplamiento de lámina están conectadas a la placa 44 de conexión de lámina y a la placa 71 de conexión de carro. El ángulo de la lámina 40 es capaz de ser ajustado utilizando una serie de orificios localizados en la placa 44 de conexión de lámina. El

ángulo de las láminas es determinado por numerosos elementos tales como la velocidad del agua y la dirección de la corriente acuática.

En el uso, el sistema subacuático 10 de
5 generación de energía está localizado dentro de una corriente de agua, de modo que la guía de deslizamiento 30 está sustancialmente perpendicular a la corriente de agua. La corriente de agua actúa sobre las láminas 40 y provoca que las láminas impulsen la cadena de impulsión 74
10 alrededor de la guía de deslizamiento 30. La cadena de impulsión 74 a su vez impulsa el engrane principal 51, el eje principal 52 y el engrane inferior 53. El engrane inferior 53 impulsa el engrane grande 101 de incremento de velocidad, el engrane pequeño 102 de incremento de
15 velocidad y el eje 103 de incremento de velocidad. La velocidad rotacional del engrane grande 101 de incremento de velocidad, el engrane pequeño 102 de incremento de velocidad y el eje 103 de incremento de velocidad es sustancialmente más grande que aquella del engrane
20 principal 51, el eje principal 52 y el engrane inferior 53.

El engrane grande 101 de incremento de velocidad impulsa el primer engrane 111 de bomba, el primer eje 112 de bomba y el engrane de transferencia 113. La velocidad rotacional del primer engrane 111 de bomba, el engrane de

transferencia 113 y el primer eje 112 de bomba es sustancialmente más grande que aquel del engrane grande, 101 de incremento de velocidad, el engrane pequeño, 102 de incremento de velocidad y el eje 103 de incremento de velocidad. El engrane de transferencia impulsa el segundo engrane 121 de bomba y el segundo eje 122 de bomba. Los ejes 112 y 122 de bomba impulsan sus respectivas bombas 114 y 124 las cuales proporcionan agua presurizada para impulsar una turbina, para crear electricidad.

10 Las aletas laterales 24 pueden ser ajustadas de modo que la rotación de la guía de deslizamiento 30 por las láminas 40 no provoca desestabilización.

Las Figuras 18 a 21 muestran un sistema subacuático 210 de generación de energía que utiliza corrientes de agua para producir electricidad, y también para desalinizar agua. El sistema subacuático 210 de generación de energía incluye una estructura 220, una guía de deslizamiento 230, una pluralidad de láminas 240 y la toma de energía 250.

20 La estructura 220 es similar a aquella mostrada en la modalidad previa, y es formada a partir de un cuerpo principal 221 que tiene dos brazos arqueados, 222, de acoplamiento. El cuerpo principal 221 está hueco y está conformado para reducir el arrastre provocado por el agua

que fluye más allá del cuerpo. Las aletas laterales 224 están localizadas en los lados del cuerpo principal 221. Cables de tensión 228 se extienden desde los brazos arqueados 222 de acoplamiento, hacia las aletas laterales 224 y el cuerpo principal 221, para proporcionar soporte adicional. Una nariz 229 se extiende con dirección hacia afuera desde el cuerpo principal 221 para dirigir la corriente de agua sobre las láminas 240.

Los miembros de soporte 225 de la guía de deslizamiento están acoplados y se extienden con dirección hacia afuera desde el cuerpo principal 221. Los miembros 225 de soporte de guía de deslizamiento son utilizados para montar la guía de deslizamiento 230. Cada miembro de soporte 225 de guía de deslizamiento es formado a partir de un brazo 226 de guía de deslizamiento y un soporte 227 de guía de deslizamiento similar a aquel mostrado en la modalidad previa. La guía de deslizamiento 230 nuevamente es de forma oval. La guía de deslizamiento 230 es formada a partir de un metal en forma de T rotada, simple, que está acoplado al soporte 227 de guía de deslizamiento.

Cada una de las láminas 240 es formada como se describe en la modalidad previa. Cada lámina 240 tiene dos alas 241 y un brazo de conexión 242. El brazo de conexión 242 tiene una placa 244 de conexión de lámina.

Un montaje 260 de carro de lámina, mostrado con detalle en las Figuras 23 a 27, es formado a partir de un alojamiento 270 de carro de lámina, dos montajes de rueda superior 280 y dos montajes 290 de rueda inferior. El alojamiento 270 de carro de lámina es formado a partir de un canal en forma de C. Las placas 247 de acoplamiento de lámina se extienden con dirección hacia arriba desde el alojamiento de carro de lámina. Un ala 271 de reducción de arrastre cubre una porción del alojamiento y reduce el arrastre cuando el carro pasa a través del agua.

Cada uno de los montajes 280 de rueda superior es formado a partir de un eje superior 281, una rueda superior 282 y un brazo de pivote 283 de la rueda superior. El brazo de pivote 283 de la rueda superior es en forma de L y está acoplado al alojamiento 270 del carro de lámina por medio de una espiga 284 de brazo de pivote de rueda superior. La espiga 284 de brazo de pivote de rueda superior permite que el brazo de pivote 283 de la rueda superior pivotee con respecto al alojamiento 270 de carro de lámina. El eje superior 282 se extiende con dirección hacia afuera desde el brazo de pivote 283 de la rueda superior, y monta rotablemente la rueda superior 282. Cada una de las ruedas superiores 282 tiene un canal 285 de rueda localizado dentro de la rueda superior 282.

Cada uno de los montajes 290 de rueda inferior es formado a partir de un eje inferior 291, una rueda inferior 292 y un brazo de pivote 293 de rueda inferior. El brazo de pivote 293 de rueda inferior es en forma de L y está acoplado al alojamiento 270 del carro de lámina, vía una espiga 294 de brazo de pivote, de rueda inferior. La espiga 294 de brazo de pivote de rueda inferior permite que el brazo de pivote 293 de la rueda inferior se mueva en pivote con respecto al alojamiento 270 del carro de lámina. El eje inferior 292 se extiende con dirección hacia afuera desde el brazo de pivote 293 de rueda inferior, y monta rotablemente la rueda inferior 292. Cada una de las ruedas inferiores 292 tiene un canal de rueda 295 localizado dentro de la rueda inferior 292.

En el uso, los canales de rueda 285 de las ruedas superiores 282 están colocados sobre la parte superior de la guía de deslizamiento 230 y los canales 295 de rueda de las ruedas inferiores 292 están colocados sobre el fondo de la guía de deslizamiento, para permitir que el montaje 260 de carro de lámina corra a lo largo de la parte superior de la guía de deslizamiento 230. Las espigas 284 de brazo de pivote de rueda superior y las espigas 294 de brazo de pivote de rueda inferior se mueven en pivote conforme el montaje 260 de carro de lámina se mueve alrededor de la

sección arqueada de la guía de deslizamiento 230. Como en la modalidad previa, el agua actúa sobre las láminas 240 para impulsar los carros alrededor de la guía de deslizamiento 230.

5 La toma de energía 250 incluye dos poleas principales 251 que están montadas a los respectivos ejes 252 de polea principal. Una banda 253 dentada plana se extiende alrededor de dos poleas principales 251. Los ejes 252 de la polea principal están montados vía el cuerpo principal 221. Los brazos de enlace 254 están acoplados a la banda dentada plana 253 y al alojamiento 270 del carro. Las poleas principales 251 son impulsadas por la banda dentada plana 253 que a su vez es impulsada por los montajes 260 de carro de lámina vía los brazos de enlace
10 254.
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Los ejes 252 de polea principal están conectados a los trenes de impulsión secundarios 300, respectivos. Cada tren de impulsión secundario impulsa un eje 301 de alternador que está conectado a un alternador 310. Un
20 intercambiador de calor 311 está asociado con el alternador 310 para asegurar que no ocurra sobre calentamiento. Los alternadores 310 están conectados a inversores 330 de corriente alterna (AC) a corriente directa (DC). Los inversores 330 permiten que la energía sea transmitida

eficientemente hacia, por ejemplo, una red de energía.

Un impulsor 320 de bomba de agua de mar está conectado al eje 302 del alternador. El impulsor 320 de bomba de agua de mar impulsa un eje de bomba de agua de mar que se conecta a e impulsa una bomba 321 de agua de mar. El agua salada es bombeada por la bomba de agua de mar a través de un desalinizador (no mostrado) para proporcionar agua fresca.

La bomba 340 de agua de mar está también conectada a un grupo de acumuladores 350 localizados adyacentes a las aletas laterales 224. Los acumuladores son utilizados para pivotear las aletas laterales 224 vía una compuerta hidráulica respectiva (no mostrada). Los acumuladores 350 hacen posible que las aletas laterales 224 estén adyacentes, sin la necesidad de operar la bomba 340 de agua de mar para movimientos pequeños.

Un compresor de aire y un motor eléctrico 360 son proporcionados para ajustar lastres dentro del cuerpo principal 221. Válvulas de soplado 361 permiten que el agua fluya dentro y fuera del cuerpo principal 221 al ajustar la cantidad de aire localizado dentro del cuerpo principal 221 vía el compresor de aire. Se utiliza una tubería 362 para controlar el flujo del aire proporcionado por el compresor de aire hacia diversas secciones del

cuerpo principal 221.

Los sensores de velocidad 370 están en diversos sitios sobre la estructura 220. Los sensores de velocidad 370 proporcionan información sobre la velocidad de la corriente de agua. Un PLC 380 proporciona una estrategia de control para controlar el flujo del agua dentro y fuera del cuerpo principal 221. Además, el PLC 380 controla la rotación de las aletas laterales 224 vía los acumuladores 350.

10 Con el fin de asegurar el armazón 220 dentro de una corriente de agua, los cables son acoplados a los extremos de cada uno de los brazos arqueados 222 vía los puntos de ancla, como se muestra en las Figuras 29 y 30. Los cables 390 están también anclados vía un ancla 400 al
15 piso del océano o de un río para mantener en posición el sistema subacuático 210 de generación de energía. Existen tres tipos de cables. Existe un cable guía o delantero 391 que se extiende desde el punto de ancla, los cables principales 392 que llevan una mayor parte de la carga y
20 los cables 393 deflectores de desechos que ayudan a prevenir que los desechos grandes golpeen las láminas 240, y dañen el sistema subacuático 210 de generación de energía.

La Figura 31 muestra una vista seccional de los

cables 390. Cada uno de los cables 390 incluye un núcleo 394 que lleva la carga, y la lámina o chapa 395 de cable para reducir el arrastre de agua. La chapa 305 de cable es capaz de girar con respecto al núcleo 394 de modo que la
5 chapa de cable es capaz de encontrar una posición de menos arrastre con respecto al núcleo 394 en la corriente acuática.

Un globo de ajuste 410 es acoplado en un extremo del cable guía 392. El globo de ajuste 410 es acoplado a
10 un snorkel 420 para hacer posible que el aire sea liberado del globo 410. Es bombeado aire dentro del globo 410 desde el compresor de aire 360, para inflar el globo 410. Nuevamente, el controlador de PLC 380 controla la cantidad de aire localizado dentro del globo.

15 Un sistema 430 de telemetría por GPS, localizado adyacente al extremo del snorkel 420, transmite los detalles operacionales del sistema subacuático 210 de generación de energía, tales como la velocidad de la corriente de agua, la posición de la estructura 220 con
20 respecto a la corriente de agua y la velocidad de las láminas a un operador basado en tierra. Además, la telemetría por GPS recibe instrucciones operacionales tales como el movimiento de la estructura 220 hacia la izquierda o hacia la derecha y/o el ajuste de la altura y encendiendo

o apagando los alternadores y/o la bomba de agua de mar, enviado por un operador basado en tierra.

En el uso, el sistema subacuático 210 de generación de energía está localizado dentro de una corriente de agua, de modo que la guía de deslizamiento 230 está sustancialmente perpendicular a la corriente de agua. La corriente de agua actúa sobre las láminas 240 y provoca que las láminas se muevan alrededor de la guía de deslizamiento 230 y en consecuencia impulsan la banda dentada plana 253. La banda dentada plana 253 a su vez impulsa las poleas principales 251 y por lo tanto los alternadores 310 y la bomba 320 de agua de mar.

Una vez que la bomba 340 de agua de mar ha comenzado la operación, los acumuladores 350 son llenados hasta su capacidad de modo que las aletas principales 224 pueden ser movidas como se desee. El PLC 380 recibe la retroalimentación desde los sensores de velocidad, y utiliza su estrategia de control para ajustar la posición de la estructura a una posición óptima dentro de la corriente acuática. La posición de la estructura es cambiada por el movimiento de las aletas laterales 224, ajustando la cantidad de agua dentro del cuerpo principal 211, y ajustando la cantidad de aire dentro del globo.

Las Figuras 32 a 34 muestran un embudo 440

acoplado a un sistema subacuático 210 de generación de energía. El embudo 440 está ahusado con un extremo más grande del embudo 440 localizado más lejos de la estructura 220 y un extremo más pequeño del embudo localizado adyacente a las láminas 240. El agua, conforme pasa a través del embudo, se incrementa en velocidad y por lo tanto, a su vez, son también incrementadas las velocidades de las láminas 240. Esto incrementa la salida de los alternadores 330 y la bomba 340 de agua de mar.

Los sistemas subacuáticos de generación de energía, detallados anteriormente, son ambientalmente amigables ya que éstos utilizan corrientes de agua naturales para crear electricidad sin la creación de ninguna contaminación. La electricidad producida es una fuente de energía renovable ya que las corrientes de agua tales como aquellas encontradas en ríos, océanos y creadas por las mareas, ocurren frecuentemente.

Los sistemas subacuáticos de generación de energía tienen todas las láminas que giran sustancialmente en un plano simple. El sistema subacuático de generación de energía está colocado de modo que el plano en que están localizadas las láminas, está perpendicular al flujo de la corriente de agua. Por lo tanto, es creada menos turbulencia conforme las láminas son propulsadas por el

agua en el mismo instante, dando como resultado una eficiencia incrementada. Una ventaja adicional de la trayectoria que está perpendicular al flujo de la corriente de agua es que las láminas siempre proporcionan una
5 impulsión al miembro lineal conforme pasan a lo largo de la trayectoria completa.

Se debe apreciar que pueden ser realizados diversos cambios y modificaciones a la modalidad descrita, sin apartarse del espíritu o alcance de la invención.

REIVINDICACIONES

1. Un sistema subacuático de generación de energía, caracterizado porque comprende:

5 al menos una guía de deslizamiento continua;
una pluralidad de carros que son movibles alrededor de la guía de deslizamiento;

al menos una lámina o chapa acoplada a cada uno de los carros, las láminas son capaces de ser impulsadas
10 por una corriente acuática;

al menos un miembro lineal conectado a los carros;

al menos una toma de energía operativamente conectada al miembro lineal;

15 en donde las láminas impulsadas provocan que los carros se muevan alrededor de la guía de deslizamiento, y por lo tanto provocan el movimiento del miembro lineal para energizar la toma de energía.

20 2. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque al menos una lámina gira sustancialmente dentro de un plano que está sustancialmente perpendicular al flujo de la corriente de agua.

3. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque la toma de energía está operativamente
5 conectada a una bomba o generador o un dispositivo similar.

4. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque la guía de deslizamiento está montada
10 a una estructura.

5. El sistema subacuático de generación de energía de conformidad con la reivindicación 4, caracterizado porque la estructura incluye un cuerpo
15 cilíndrico principal, dos brazos arqueados y soportes de guía de deslizamiento.

6. El sistema subacuático de generación de energía de conformidad con la reivindicación 5, caracterizado porque cada soporte de guía de deslizamiento
20 incluye un brazo de guía de deslizamiento y un soporte de guía de deslizamiento.

7. El sistema subacuático de generación de

energía de conformidad con la reivindicación 1, caracterizado porque la guía de deslizamiento está formada a partir de dos placas laterales de guía de deslizamiento, una placa de guía de deslizamiento inferior y dos placas
5 adjuntas.

8. El sistema subacuático de generación de energía, caracterizado porque cada lámina es formada de dos alas y un brazo de conexión.

10

9. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque cada carro es formado a partir de un miembro de soporte lineal, al menos un montaje de rueda
15 superior y al menos un montaje de rueda inferior.

10. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque cada lámina es pivotablemente montada
20 a su carro respectivo.

11. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque incluye además un montaje de

incremento de velocidad y al menos un montaje de bomba, ambos impulsados por el miembro lineal.

12. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque el miembro lineal es una cadena.

13. El sistema subacuático de generación de energía de conformidad con la reivindicación 5, caracterizado porque incluye además un compresor de aire y un motor eléctrico, para ajustar el lastre dentro del cuerpo principal.

RESUMEN DE LA INVENCION

Se describe un sistema subacuático (10) de generación de energía que comprende al menos una guía de deslizamiento (30); una pluralidad de carro (60) que son
5 movibles alrededor de la guía de deslizamiento, y al menos una lámina o chapa (40) acoplada a cada uno de los carros, las láminas van a ser impulsadas por una corriente acuática; al menos un miembro lineal conectado a los carros; al menos una toma de energía (50) operativamente
10 conectada al miembro lineal, en donde las láminas impulsadas provocan que los carros se muevan alrededor de la guía de deslizamiento, y por lo tanto provocan el movimiento del miembro lineal para energizar la toma de energía.

TRADUCCIÓN OFICIAL No 06/245 de un documento escrito en inglés, el cual para su identificación se sella con el sello del traductor al tiempo con la presente. Esta traducción ha sido preparada por Juan Pablo Piedrahita Aguilera, Traductor e Intérprete Oficial debidamente reconocido de conformidad con el Certificado de Idoneidad Profesional No 0045 expedido por la Universidad Nacional de Colombia, por el Ministerio de Relaciones Exteriores y autorizado por el Ministerio del Interior y de Justicia, por resolución número 718 de 2003

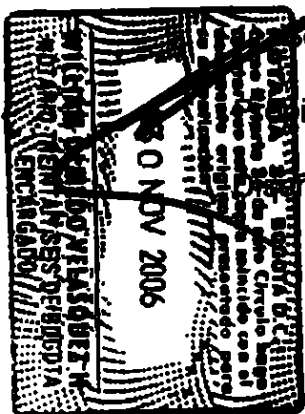
(Se traduce un Poder, otorgado por la compañía ATLANTIS RESOURCES CORPORATION PTE LIMITED, firmado por Kim Manley, con fecha 6 de Marzo, 2006, certificado notarial y Apostilla No B00014817, escritos en inglés)

COLOMBIA

(Dirección en español)

PODER

Yo el suscrito, Kim Manley, representante legal de ATLANTIS RESOURCES CORPORATION PTE. LIMITED, sociedad constituida y existente bajo las leyes de Singapur y en actual cumplimiento de su objeto social, con domicilio en 5 Shenton Way, #02-02 UIC Building, Singapur, por el presente por el presente confiero (conferimos) poder especial a favor de a DILIA MARÍA RODRÍGUEZ D'ALEMÁN, identificada con cédula de ciudadanía No. 41.654.882 de Bogotá y Tarjeta Profesional 20824 y CLAUDIA LUCIA CARO RAMIREZ, identificada con Tarjeta Profesional 36448 y cédula de ciudadanía No 40 017 374 de Tunja, con domicilio en Bogotá, Colombia, para que actuando en su orden en nombre de la otorgante la representen ante cualquier entidad, autoridad y/o persona, especialmente ante las del orden Administrativo, Contencioso Administrativo, Judicial, Tribunales de Arbitramento y/o cualquier otro en lo referente a lo siguiente: UN SISTEMA SUBACUÁTICO DE GENERACIÓN DE ENERGÍA



solicitar, tramitar, obtener y/o registrar cualesquiera de las modalidades de propiedad Industrial, tales como Patentes de Invención, Modelos de Utilidad, Diseños Industriales, variedades vegetales, Marcas, Lemas, Nombres y

78

Enseñas Comerciales y Denominaciones de Origen, así como sus renovaciones, prórrogas, traspasos, cambios de nombre y/o domicilio, contratos y licencias.

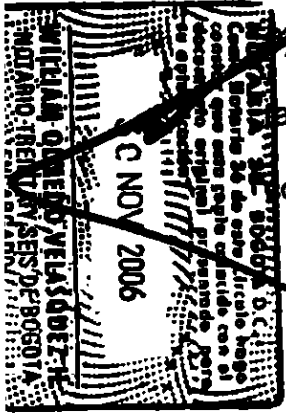
2) Solicitar, tramitar, obtener, y/o registrar derechos de autor, en cualquiera de sus presentaciones así como la protección de secretos industriales y "know-how".

3) Solicitar, tramitar, obtener y/o registrar registros sanitarios, permisos y/o licencias de funcionamiento, así como sus renovaciones o prórrogas, cesiones, traspasos, cambios de nombre y/o domicilio, contratos y licencias

4) Ejercer acciones de oposición, observación, reclamos, reivindicaciones, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos derivados de los asuntos arriba indicados y en contra de la competencia desleal, acciones derivadas de la obtención o explotación de licencias, acciones de indemnización de perjuicios También podrán intervenir en juicios civiles, comerciales, penales, contencioso-administrativos, tutelas y de policía; acciones o juicios promovidos por el mandante o contra él

5) Registrar nombres de dominio ante la entidad competente

En el ejercicio de este mandato los mandatarios arriba mencionados quedan facultados para conciliar, cancelar, transigir, aceptar cláusulas compromisorias, desistir, recibir y tomar posesión de la cosa objeto de litigio y



renunciar o desistir derechos concedidos o en curso de concesión, admitir los hechos del proceso

7) Ratificar o no la agencia oficiosa.

8) Así mismo facultamos a los mencionados apoderados para recibir notificaciones y designar apoderados judiciales o extrajudiciales, sustituir el presente poder y revocar las sustituciones que hicieren

Dado y firmado en BRISBANE, AUSTRALIA, hoy día 6 de Marzo, 2006.

Por: (Firmado) Kim Manley, Director

(Sello Notarial en Relieve) (Firma)

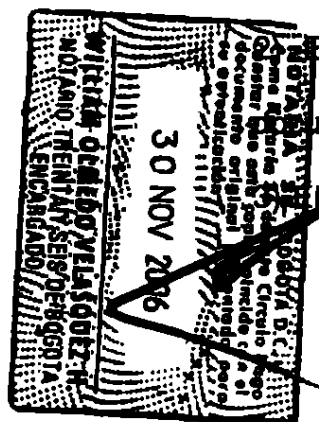
(Sello Notarial a Tinta GEORGE PAUL JAMES ANTHONY, NOTARIO PÚBLICO, P O. BOX 6250 UPPER MT. GRAVATT, BRISBANE, AUSTRALIA, Q 4122, TEL. 617 07 3343 5511, FAX 3849 6623)

CERTIFICADO NOTARIAL (Cuando el solicitante es una SOCIEDAD)

(Poderes otorgados en El Salvador, México, Estados Unidos de América y Venezuela)

Expedido hoy día 6 de Marzo, 2006, el suscrito Notario CERTIFICA que

1). Kim Manley, (nombre de quien firma el poder), mayor de edad y domiciliado en Australia, suscribió el anterior documento



El otorgante le es conocido personalmente y tiene capacidad para firmar el documento

El otorgante ha suscrito el anterior documento en su calidad de Director de

TRADUCCION OFICIAL No. 06 / 4
JUAN F. LLORENTE AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
del 16 de Mayo 2003
DEL MIN. INTERIOR Y DE JUSTICIA

la persona jurídica ATLANTIS RESOURCES CORPORATION PTE LIMITED.

4) La mencionada persona jurídica con domicilio comercial en SINGAPUR, está debidamente constituida, tiene actualmente existencia legal y el fin para el cual se otorga este poder se encuentra dentro de su objeto social

5) El otorgante tiene en efecto la capacidad referida y su representación es legal y está autorizado para otorgar este poder

6) Fundamento las certificaciones 3), 4) y 5) en los documentos auténticos que para tal fin me fueron exhibidos

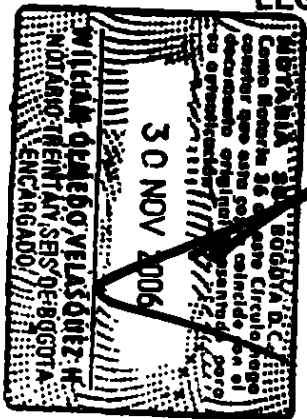
(Firmado) Notario Público 6/3/06

(Sello Notarial a Tinta GEORGE PAUL JAMES ANTHONY, NOTARIO PÚBLICO, P O. BOX 6250 UPPER MT. GRAVATT, BRISBANE, AUSTRALIA, Q 4122, TEL 617 07 3343 5511, FAX 3849 6623)

Nota: El Consulado de Colombia debe autenticar la firma del Notario Público

Para todos los demás países el Señor Cónsul de Colombia o ante quien se otorgue, debe expedir una certificación dejando constancia de: 1) la existencia legal de la sociedad, 2) que cumple actualmente con su objeto social, y 3) que la persona o personas que otorgan este poder están facultadas para hacerlo. El Cónsul también certificará que los tuvo a la vista los documentos que prueban y acreditan tales circunstancias.

LEGALIZACIÓN POR EL CÓNSUL DE COLOMBIA A O POR APOSTILLA



4

06/245
 TRADUCCION OFICIAL No. _____
 JUAN PABLO RIVERA AGUILERA
 TRADUCTOR E INTERPRETE OFICIAL
 RES 116 DE MARZO 2003
 DEL MIN. INTERIOR Y DE JUSTICIA

81 \$

(Sello Pre-Impreso)

AUSTRALIA

APOSTILLA

(Convención de la Haya de Octubre 5 de 1961)

- 1 País: Australia
Este documento público
- 2 Ha sido firmado por GEORGE PAUL JAMES ANTHONY
- 3 Obrando en calidad de Notario Público
- 4 Lleva el sello/estampilla de GEORGE P. J. ANTHONY Notario Público, Queensland, Australia

CERTIFICADA

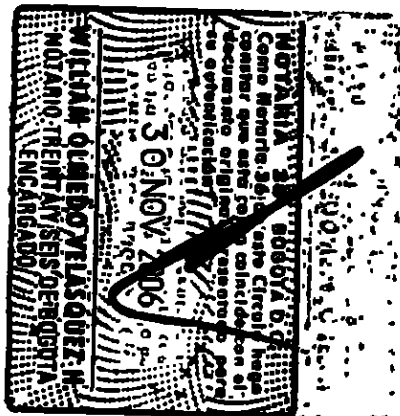
5. En Queensland 6 Hoy día Veintisiete de Abril, 2006
7. Por Geoff Kelly, Departamento de Relaciones Exteriores y Comercio Exterior, Queensland, Australia
- 8 No. **B00014917**
- 9 Sello/Estampilla (Sello a Tinta del Departamento de Relaciones Exteriores y Comercio Exterior de Sydney) (SELLO ROJO DE OBLEA EN RELIEVE)
- 10 Firma (Firmado)

Al respaldo: (Sello Rojo de Oblea en Relieve con Cinta Verde).

(Sello en Relieve)

ES TRADUCCIÓN FIEL Y COMPLETA de la cual se deja copia en los archivos de esta oficina para su confrontación y a la cual me remito

Bogotá, Mayo 18, 2006



Juan Pablo Piedrahita Aguilera
06/245

TRADUCCION OFICIAL No. _____
JUAN PABLO PIEDRAHITA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
DES 118 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

NO SE ASUME
RESPONSABILIDAD DEL TEXTO

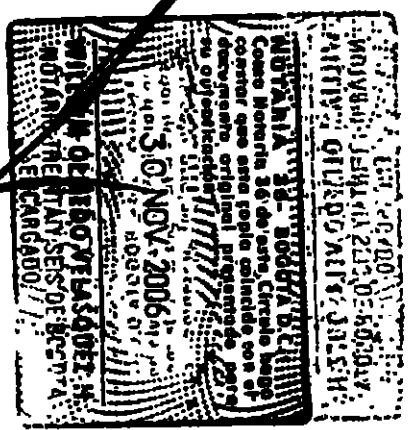
2006 MAY 23 P 12:54

[Signature]
JEFE DE LEGALIZACIONES
BOGOTÁ D.C.

MINISTERIO DE
RELACIONES EXTERIORES

448876

Juan Pedrohita
CUNATISA APAPECE EN EL
GOBIERNO DE SIEMPRE
LAS FUNCIONES INDICADAS



Clarke, Modet & C^o

COLOMBIA

Carrera 11 n° 86-53, Piso 6 Bogota Colombia Tel (57 1) 618 1088 Fax (57 1) 6350824 Email clarkemodet@clarkemodet.com.co

PODER

Yo (nosotros), abajo firmante(s)

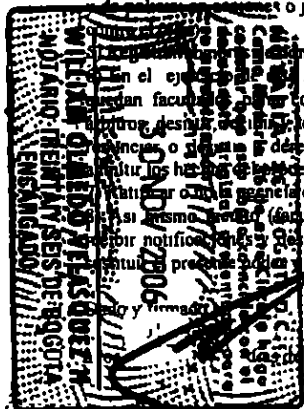
en mi (nuestro) caracter de representante(s) legales de

una sociedad organizada y existente de acuerdo con las leyes de

y en actual cumplimiento de su objeto social, con domicilio en

por el presente instrumento confiero (conferimos) poder especial a favor de DILIA MARIA RODRIGUEZ D'ALEMAN, con Cedula de Ciudadania No 41 654 882 de Bogota, y tp 20824 y CLAUDIA LUCIA CARO RAMIREZ, con Cedula de Ciudadania No 40 017 374 de Tunja, y tp 36448, con domicilio en Bogota, Colombia, para que actuando en su orden en nombre del (de la) otorgante le (la) representen ante cualquier entidad, autoridad y/o persona, especialmente ante las del orden Administrativo, Contencioso Administrativo, Judicial, Tribunales de Arbitramento y/o cualquier otro en lo referente a los siguientes asuntos

- 1) Solicitar, tramitar, obtener y/o registrar cualquiera de las modalidades de Propiedad Industrial, tales como patentes de invención, modelos de utilidad, diseños industriales, variedades vegetales, marcas, lemas, nombres y enseñas comerciales y denominaciones de origen, así como sus renovaciones, prórrogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias
- 2) Solicitar, tramitar, obtener y/o registrar derechos de autor, en cualquiera de sus presentaciones así como la protección de secretos industriales y know-how
- 3) Solicitar, tramitar, obtener y/o registrar registros sanitarios, permisos y/o licencias de funcionamiento, así como sus renovaciones o prórrogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias
- 4) Ejercer acciones de oposición, observación, reclamos, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos derivados de los asuntos arriba indicados y en contra de la competencia desleal, acciones derivadas de la obtención o explotación de licencias, acciones de indemnización de perjuicios. También podrá(n) intervenir en juicios civiles, comerciales, penales, contencioso-administrativos, tutelas de protección de derechos o juicios promovidos por el (la) mandante o en



6/3/06
GEORGE PAUL JAMES ANTHONY
NOTARY PUBLIC
P.O. BOX 6250 UPPER MT GRAVATT
BRISBANE AUSTRALIA Q 4122
PH: 617 07 3343 5511
FAX: 3849 6623

POWER OF ATTORNEY

I (we), the undersigned **Kim Hanley**

legal representative(s) of **ATLANTIS RESOURCES CORPORATION PTE. LIMITED**

an organization existing under the laws of **Singapore**

and in present execution of its business activity, domiciled at **5 Shenton Way, #02-02 UIC Building, Singapore**

do hereby grant POWER OF ATTORNEY to DILIA MARIA RODRIGUEZ D'ALEMAN, identification card No 41 654 882 of Bogota, and tp 20824 and CLAUDIA LUCIA CARO RAMIREZ, tp 36448, identification card No 40 017 374 of Tunja, residing in Bogota, Colombia, to act in the order of their appointment in behalf of grantor before any entity, authority and/or natural or juridical person, specially before those Administrative, Administrative-Contentious, Judicial, arbitration courts, and/or any other, in all matters concerning the following

A SYSTEM OF UNDERWATER POWER GENERATION

1) To apply, process, obtain and/or register any of the modalities of Industrial Property, such as Patents of Invention, Utility Models, Designs, plant varieties, Marks, Slogans, Trade Names and emblems and appellations of Origin, as well as their renewals, extensions, assignments, changes of name and/or domicile, agreements and licenses

2) To apply, process, obtain and/or register copyrights of any kind as well as protection of industrial secrets or know-how

3) To apply, process, obtain and/or register sanitary registrations, operating authorizations and/or licenses, as well as their renewals or extensions, assignments, changes of name and/or domicile, agreements and licenses

4) To bring actions of opposition, observations, claims, reconsideration, appeal or legal remedies, cancellations, nullity, protection to the consumer, granting of licenses, protection of trade secrets and other actions related with rights derived from the above-mentioned matters and against the unfair competition, actions resulting from the obtaining or exploitation of licenses, recovering damages actions. They can also intervene or participate in Civil, Commercial, Criminal or Contentious-Administrative Trials, the actions for writ mandamus, police actions, in actions, lawsuits or litigations instituted by the grantor or against him

5) To register domain names before the competent entity

6) To the effect of this mandate the above-named proxy are empowered to conciliate, cancel, settle, submit to arbitration, withdraw and to receive and take possession of the litigation related object and waive or renounce the rights granted or in process of granting, admit the facts of the case

7) To ratify or not the officious agency

8) I (we) hereby appoint the afore mentioned attorneys with powers to receive notifications and to designate judicial and extra-judicial attorneys, substitute this Power of Attorney and to revoke such substitutions

Granted and signed at **BRISBANE AUSTRALIA**
on this **6th** day of **MARCH** of **2006**
461245

Firma / signature

KIM HANLEY
DIRECTOR
TRANSCRIPCION OFICIAL No. _____
TRADUCTOR E INTERPRETE OFICIAL
RES 118 DE LA LEY 1339 DE 2004
DEL MIN. INTERIOR Y DE JUSTICIA

CERTIFICADO NOTARIAL

(Cuando el solicitante es SOCIEDAD)

(Poderes otorgados en El Salvador, Estados Unidos, México y Venezuela)

A los _____ días del mes de _____ de _____
el Notario que suscribe DA FE de que

1 _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado _____
firmó de su puño

y letra el documento que antecede

2 Conoce al (a la) otorgante y que este (a) está legalmente capacitado para el otorgamiento

3 El otorgante ha firmado el referido documento en su carácter de _____

de la persona jurídica _____

4 La citada persona jurídica con sede en _____ está legalmente constituida, que tiene actualmente

existencia legal y que el acto para el cual se ha otorgado este poder está comprendido entre los que constituyen su objeto social

5 El otorgante tiene efectivamente la representación que ostenta, que esta es legítima y que está facultado para otorgar este poder

6 las anteriores certificaciones de los puntos 3, 4 y 5, me constan porque he tenido a la vista los documentos auténticos

Notario Público

NOTA A continuación de lo anterior, el Cónsul de Colombia debe autenticar la firma del Notario Público

CERTIFICADO NOTARIAL (Cuando el solicitante es INDIVIDUO)

A los _____ días del mes de _____ de _____
el Notario que suscribe DA FE de que

1 _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado en _____

firmó en su presencia

el documento que antecede, conoce al otorgante y que este está legalmente capacitado para el otorgamiento

Notario Público

NOTA A continuación de lo anterior, el Cónsul de Colombia debe autenticar la firma del Notario Público

Para todos los demás países el Señor Cónsul de Colombia o ante quien se otorgue, debe expedir una certificación dejando constancia de que el otorgante es legal de la sociedad, 2) de que esta ejerce su objeto social, y 3) de que la persona o personas que otorgan el poder están facultadas para hacerlo, dejando constancia de que tuvo a la vista las pruebas que acrediten tales circunstancias.

LEGATIMIZACIÓN POR EL CONSUL DE COLOMBIA

OR POR APOSTILLE

35 / 2 LEGALIZATION BY THE COLOMBIAN CONSUL OR BY APOSTILLE
TRADUCCION OFICIAL No. _____
JUAN PABLO PIED AHUA AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
RES 718 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

NOTARIAL CERTIFICATE

(When the applicant is a CORPORATION)

(Powers of attorney granted in El Salvador, Mexico, U S A and Venezuela)

This _____ day of MARCH 2006
the undersigned Notary CERTIFIES that

1 KIM MANLEY
(name of the person who signs the power of attorney)

of legal age and domiciled in AUSTRALIA
set his hand on the

foregoing document

2 The grantor is to him personally known and that he/she has legal capacity to execute the document

3 The grantor has executed the foregoing document in his capacity of DIRECTOR

of the juridical person ATLANTIS RESOURCES CORPORATION
PTE LIMITED

4 The mentioned juridical person with place of business in SINGAPORE

is duly organized, has actual legal existence and that the purposes for which the power of attorney is granted are within the scope of its corporate purposes

5 The grantor has in fact the referred quality and that his/her representation is legal and that he/she is empowered to grant this power of attorney

6 I have based the above certifications 3, 4 and 5, on the authentic documents which for such purpose were exhibited to me

Notary Public

GEORGE PAUL JAMES ANTHONY

NOTARY PUBLIC

P.O. BOX 6250 UPPER MT. GRAVATT

BRISBANE AUSTRALIA Q 4122

PH: 617 07 3343 5511

FAX: 3849 6623

On this _____ day of _____
the undersigned Notary CERTIFIES that

1 _____
(name of the person who signs the Power of Attorney)

of legal age and domiciled at _____
signed in his presence the foregoing document, the grantor is to him personally known and that he/she has legal capacity to execute the document

Notary Public

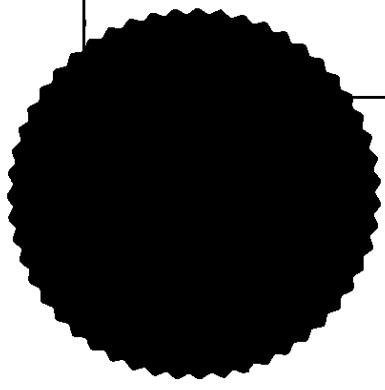
NOTA Then the Colombian Consul must legalize the signature of the Notary Public

For all other countries the Colombian Consul or before who it is granted must issue a certification stating 1) the legal existence of the corporation, 2) that the corporate purposes are actually being accomplished, 3) that the person or persons who grant this Power of Attorney are empowered to do it. The Consul will certify also that the documents evidencing those circumstances were exhibited to him.



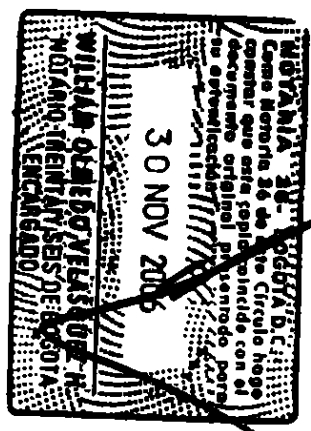
APOSTILLE
(Convention de La Haye du 5 octobre 1961)

1 Country	Australia
This public document	
2 has been signed by	George Paul James Anthony
3 acting in the capacity of	Notary Public
4 bears the seal/stamp of	George P J Anthony, Notary Public, Queensland, Australia
Certified	
5 at Queensland	6 the 27th day of April, 2006.
7 by Geoff Kelly	Department of Foreign Affairs and Trade, Queensland, Australia
8 No. B00014917	
9 Seal/Stamp	10 Signature



06/245

TRADUCCION OFICIAL No. _____
JUAN PABLO PIEDRA ACQUILERA
TRADUCTOR E INTERPRETE OFICIAL
del 21 de Mayo 2006
DEL MIN. INTERIOR Y DE JUSTICIA



85

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 13291PC2-PJD	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No PCT/AU2005/000779	International filing date (day/month/year) 1 June 2005	Priority date (day/month/year) 1 June 2004
International Patent Classification (IPC) or national classification and IPC Int. Cl. F03B 13/10 (2006.01) F03B 13/12 (2006.01) F03B 13/26 (2006.01)		
Applicant ATLANTIS RESOURCES CORPORATION PTE LIMITED et al		

() This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of **3** sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising.

a. ☒ (sent to the applicant and to the International Bureau) a total of **2** sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4 This report contains indications relating to the following items.

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand 31 March 2006	Date of completion of this report 09 May 2006
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No (02) 6285 3929	Authorized Officer SARAVANAMUTHU PONNAMPALAM Telephone No. (02) 6283 2070

Box No. I	Basis of the report
1	With regard to the language, this report is based on: ☒ The international application in the language in which it was filed ☐ A translation of the international application into _____, which is the language of a translation furnished for the purposes of: ☐ international search (under Rules 12.3(a) and 23.1 (b)) ☐ publication of the international application (under Rule 12.4(a)) ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a)) 2. With regard to the elements of the international application, this report is based on <i>(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)</i>: ☐ the international application as originally filed/furnished ☒ the description: pages 1,2,4-13 as originally filed/furnished pages* 3 received by this Authority on 28 April 2006 with the letter of 28 April 2006 pages* received by this Authority on with the letter of ☒ the claims: pages 15 as originally filed/furnished pages* as amended (together with any statement) under Article 19 pages* 14 received by this Authority on 28 April 2006 with the letter of 28 April 2006 pages* received by this Authority on with the letter of ☒ the drawings pages 1-21 as originally filed/furnished pages* received by this Authority on with the letter of pages* received by this Authority on with the letter of ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing. 3. ☐ The amendments have resulted in the cancellation of: ☐ the description, pages ☐ the claims, Nos. ☐ the drawings, sheets/figs ☐ the sequence listing <i>(specify)</i>. ☐ any table(s) related to the sequence listing <i>(specify)</i>: 4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70 2(c)). ☐ the description, pages ☐ the claims, Nos. ☐ the drawings, sheets/figs ☐ the sequence listing <i>(specify)</i>: ☐ any table(s) related to the sequence listing <i>(specify)</i>:

* If item 4 applies, some or all of those sheets may be marked "superseded"

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-13	YES
	Claims	NO
Inventive step (IS)	Claims 1-13	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-13	YES
	Claims	NO

2 Citations and explanations (Rule 70.7)

NOVELTY (N) and INVENTIVE STEP (IS)

A. The documents constituting the closest prior art are:

- (i) GB 2214239 A
- (ii) FR 2474106 A
- (iii) DE 20312364 U

B. The subject matter of claim 1 differs from these prior art documents in that a plurality of carriages that are movable around the track and at least one line member connected to the carriages. Further the line member is operatively connected power take-off to power the power take-off.

C. The distinguishing features of the invention will create less turbulence and hence resulting in increased efficiency.

D. Therefore the application satisfies the criteria set forth in PCT Article 33(2-3), concerning the novelty and inventive step of the independent claim 1.

E. The criteria concerning novelty and inventive step of claims 2-13 are satisfied because these claims are dependent on claim 1.

INDUSTRIAL APPLICABILITY (IA)

The invention defined in claims 1-13 satisfies the criterion set forth in PCT Article 33(4).

DISCLOSURE OF THE INVENTION

In one form, although it need not be the only or indeed the broadest form, the invention resides in an underwater power generation system comprising:

- 5 at least one continuous track;
 a plurality of carriages that are movable around said track;
 at least one foil attached to each of the carriages, said foils able to be driven by a water current;
 at least one line member connected to the carriages;
10 at least one power take-off operatively connected to said carriages;
 wherein the driven foils cause the carriages to move around said track to cause movement of said power take-off.

The at least one foil rotates substantially within a plane that is substantially perpendicular to flow of water current.

- 15 The power take-off may be operatively connected to a pump or generator or the like device.

Further features of the present invention will become apparent from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

- 20 To assist in understanding the invention and to enable a person skilled in the art to put the invention into practical, an embodiment of the invention will be described by way of example only with reference to the accompanying drawings, wherein:

- 25 FIG. 1 shows a top view of an underwater power generation system according to a first embodiment of the present invention;

 FIG. 2 shows front view of the underwater power generation system of FIG. 1,

 FIG. 3 shows a side sectional view of the underwater power generation system of FIG. 1;

- 30 FIG. 4 shows a side sectional view of the underwater power generation system of FIG. 1;

 FIG. 5 shows a top view of a track shown in FIG. 1;

 FIG. 6 shows a cross-sectional view of the track along the line A-A;

CLAIMS:

1. An underwater power generation system comprising:
at least one continuous track;
a plurality of carriages that are movable around said track;
5 at least one foil attached to each of the carriages, said foils able to be driven by a water current;
at least one line member connected to the carriages;
at least one power take-off operatively connected to said carriages;
wherein the driven foils cause the carriages to move around to cause
10 movement of said power take-off.
2. The underwater power generation system of claim 1 wherein at least one foil rotates substantially within a plane that is substantially perpendicular to flow of water current.
3. The underwater power generation system of claim 1 wherein the power
15 take-off is operatively connected to a pump or generator or the like device.
4. The underwater power generation system of claim 1 wherein the track is mounted to a frame.
5. The underwater power generation system of claim 4 wherein the frame includes a main cylindrical body, two arcuate arms and track supports.
- 20 6. The underwater power generation system of claim 5 wherein each track support includes a track arm and a track cradle.
7. The underwater power generation system of claim 1 wherein the track is formed from two side track plates, a bottom track plate and two joining plates.
8. The underwater power generation system wherein each foil is formed
25 from two wings and a connection arm.
9. The underwater power generation system of claim 1 wherein each carriage is formed from a line support member, at least one top wheel assembly and at least one bottom wheel assembly.
10. The underwater power generation system of claim 1 wherein each foil is
30 pivotally mounted to its respective carriage.
11. The underwater power generation system of claim 1 further including a speed increase assembly and at least one pump assembly, both driven by the line member.

OBJETIVO DE LA INVENCION

Un objetivo de la invención es superar o aliviar al menos una o más de las desventajas anteriores o proporcionarle al consumidor una elección útil o comercial.

DESCRIPCIÓN DE LA INVENCION

En una forma, aunque no necesite ser la única o por supuesto la forma más amplia, la invención radica en un sistema subacuático de generación de energía que comprende:

al menos una guía de deslizamiento continua;

una pluralidad de carros que son movidos alrededor de la guía de deslizamiento;

al menos una lámina acoplada a cada uno de los carros, las láminas son capaces de ser impulsadas por una corriente acuática;

al menos un miembro lineal conectado a los carros;

al menos una toma de energía operativamente conectada a dichos carros;

en donde las hojas o láminas impulsadas provocan que los carros se muevan alrededor de la guía de deslizamiento para provocar el movimiento de dicha toma de energía.

REIVINDICACIONES

1. Un sistema subacuático de generación de energía, caracterizado porque comprende:

al menos una guía de deslizamiento continua;

una pluralidad de carros que son movibles alrededor de la guía de deslizamiento;

al menos una lámina o chapa acoplada a cada uno de los carros, las láminas son capaces de ser impulsadas por una corriente acuática;

al menos un miembro lineal conectado a los carros;

al menos una toma de energía operativamente conectada a dichos carros;

en donde las láminas impulsadas provocan que los carros se muevan alrededor de para provocar el movimiento de dicha toma de energía.

2. El sistema subacuático de generación de energía de conformidad con la reivindicación 1, caracterizado porque al menos una lámina gira sustancialmente dentro de un plano que está sustancialmente perpendicular al flujo de la corriente de agua.

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below.

IPEA/ AU

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference 13291PC2-PJD	
International application No PCT/AU2005/000779	International filing date (day/month/year) 1 JUNE 2005
(Earliest) Priority date (day/month/year) 1 JUNE 2004	
Title of invention A SYSTEM OF UNDERWATER POWER GENERATION	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name, for a legal entity, full official designation. The address must include postal code and name of country.)	
ATLANTIS RESOURCES CORPORATION PTE LIMITED	
5 Shenton Way	
#2-02 UIC Building	
SINGAPORE	
Telephone No.	
Facsimile No.	
Teleprinter No.	
Applicant's registration No. with the Office	
State (that is, country) of nationality: SG	State (that is, country) of residence: SG
Name and address: (Family name followed by given name, for a legal entity, full official designation. The address must include postal code and name of country.)	
PERRY, Michael, David	
2 Neill Street	
LAWRENCE, New South Wales 2460	
Australia	
State (that is, country) of nationality: AU	State (that is, country) of residence: AU
Name and address: (Family name followed by given name, for a legal entity, full official designation. The address must include postal code and name of country.)	
GILMORE, Duncan, Bartlett	
16 Coreall Avenue	
SAMFORD, Queensland 4520	
Australia	
State (that is, country) of nationality: AU	State (that is, country) of residence: AU
☒ Further applicants are indicated on a continuation sheet.	

Continuation of Box No. II APPLICANT(S) <i>If none of the following sub-boxes is used, this sheet should not be included in the demand.</i>	
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country)</i> HOPE, Raymond, Lindsay 17 Chelva Street WISHART, Queensland 4122 Australia	
State <i>(that is, country)</i> of nationality AU	State <i>(that is, country)</i> of residence: AU
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country)</i> CAMPBELL, Gary, James 192 Tanglewood Road LAWRENCE, New South Wales 2460 Australia	
State <i>(that is, country)</i> of nationality. AU	State <i>(that is, country)</i> of residence: AU
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country)</i> KRUGER, Melissa, Louise 15 Princeton Street KENMORE, Queensland 4069 Australia	
State <i>(that is, country)</i> of nationality AU	State <i>(that is, country)</i> of residence AU
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country)</i> KEATING, Carmen Patricia 6/231 Vulture Street SOUTH BRISBANE, Queensland 4101 Australia	
State <i>(that is, country)</i> of nationality: AU	State <i>(that is, country)</i> of residence: AU
☐ Further applicants are indicated on another continuation sheet.	

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlierName and address: (Family name followed by given name; for a legal entity, full official designation.
The address must include postal code and name of country.)FISHER ADAMS KELLY
Level 29 Comalco Place
12 Creek Street
BRISBANE, Queensland 4000
Australia

Telephone No

+7 3229 2655

Facsimile No.

+7 3221 0597

Teleprinter No.

Agent's registration No. with the Office

pdavis@fak.com.au

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description

☐

as originally filed

☒

as amended under Article 34

the claims

☐

as originally filed

☐

as amended under Article 19 (together with any accompanying statement)

☒

as amended under Article 34

the drawings

☐

as originally filed

☐

as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of the applicable time limit under Rule 69.1(d)4. ☐ The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54bis 1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended

Language for the purposes of international preliminary examination: ENGLISH

☒

which is the language in which the international application was filed.

☐

which is the language of a translation furnished for the purposes of international search.

☐

which is the language of publication of the international application.

☐

which is the language of the translation (to be) furnished for the purposes of international preliminary examination

Box No. V ELECTION OF STATES

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | | |
|---|---|---|--------|
| 1 | translation of international application | : | sheets |
| 2 | amendments under Article 34 | : | sheets |
| 3 | copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4 | copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5 | letter | : | sheets |
| 6 | other (specify) | : | sheets |

For International Preliminary
Examining Authority use only

- | received | not received |
|--------------------------|--------------------------|
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |

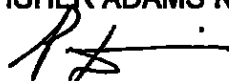
The demand is also accompanied by the item(s) marked below:

- | | |
|--|--|
| 1. ☒ fee calculation sheet | 5. ☐ statement explaining lack of signature |
| 2. ☐ original separate power of attorney | 6. ☐ sequence listing in computer readable form |
| 3. ☐ original general power of attorney | 7. ☐ tables in computer readable form related to a sequence listing |
| 4. ☐ copy of general power of attorney, reference number, if any: | 8. ☐ other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand)

ATLANTIS ENERGY LIMITED et al
By their Patent Attorneys
FISHER ADAMS KELLY


PAUL J DAVIS
Registered Patent Attorney

For International Preliminary Examining Authority use only

1 Date of actual receipt of DEMAND.

2 Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

- | | |
|--|---|
| 3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.
☐ The applicant has been informed accordingly. | 6. ☐ The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54bis 1(a) and item 7 or 8, below, does not apply. |
| 4. ☐ The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5 | 7. ☐ The date of receipt of the demand is WITHIN the time limit under Rule 54bis 1(a) as extended by virtue of Rule 80.5. |
| 5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. | 8. ☐ Although the date of receipt of the demand is after the expiration of the time limit under Rule 54bis 1(a), the delay in arrival is EXCUSED pursuant to Rule 82 |

For International Bureau use only

Demand received from IPEA on:

PCT

FEE CALCULATION SHEET

Annex to the Demand

International application No PCT/AU2005/000779 Applicant's or agent's file reference 13291PC2-PJD Applicant ATLANTIS ENERGY LIMITED et al	For International Preliminary Examining Authority use only Date stamp of the IPRA								
CALCULATION OF PRESCRIBED FEES 1 Preliminary examination fee 550.00 P 2. Handling fee (<i>Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.</i>) 205.00 H 3 Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box 755.00 TOTAL									
MODE OF PAYMENT <table style="width: 100%;"> <tr> <td>☐ authorization to charge deposit account with the IPEA (see below)</td> <td>☐ cash</td> </tr> <tr> <td>☒ cheque</td> <td>☐ revenue stamps</td> </tr> <tr> <td>☐ postal money order</td> <td>☐ coupons</td> </tr> <tr> <td>☐ bank draft</td> <td>☐ other (specify) ..</td> </tr> </table>		☐ authorization to charge deposit account with the IPEA (see below)	☐ cash	☒ cheque	☐ revenue stamps	☐ postal money order	☐ coupons	☐ bank draft	☐ other (specify) ..
☐ authorization to charge deposit account with the IPEA (see below)	☐ cash								
☒ cheque	☐ revenue stamps								
☐ postal money order	☐ coupons								
☐ bank draft	☐ other (specify) ..								
AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT (This mode of payment may not be available at all IPEAs) <table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> ☐ Authorization to charge the total fees indicated above. ☐ (This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above. </td> <td style="width: 50%; vertical-align: top;"> IPEA/ Deposit Account No. Date: Name: Signature. </td> </tr> </table>		☐ Authorization to charge the total fees indicated above. ☐ (This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	IPEA/ Deposit Account No. Date: Name: Signature.						
☐ Authorization to charge the total fees indicated above. ☐ (This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	IPEA/ Deposit Account No. Date: Name: Signature.								

92 12

PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 13291 PC2-PJD	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/AU2005/000779	International filing date (day/month/year) 1 June 2005	(Earliest) Priority Date (day/month/year) 1 June 2004
Applicant ATLANTIS ENERGY LIMITED et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau

This international search report consists of a total of 4 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (See Box No. III)

4. With regard to the title,

☒ the text is approved as submitted by the applicant

☐ the text has been established by this Authority to read as follows

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 2

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention

- b. ☐ none of the figures is to be published with the abstract

Box No. IV Text of the Abstract (Continuation of item 5 of the first sheet)

An underwater power generation system (10) comprising at least one continuous track (30); a plurality of carriages (60) that are movable around said track, at least one foil (40) attached to each of the carriages, said foils able to be driven by a water current; at least one line member connected to the carriages; at least one power take-off (50) operatively connected to said line member; wherein the driven foils cause the carriages to move around said track and hence cause movement of said line member to power said power take-off.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/000779

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ : F03B 13/10, 13/12, 13/26		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI, F03B 13/10, 13/12, 13/26, 9/00, 13/00, 17/00 E02B 9/08, 9/02, key words PADDLE+, BLAD+, PERPENDIC+, TRANSVERS+, CURRENT+, FLOW+, RIVER+, STREAM+, WATER+, OCEAN+, STREAM+, POWER+, TURBIN+, ELECTRICITY+, GENERAT+, UNDERWATER+, BELT+, CONVEY+, CHAIN+, ENDLESS+		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2214239 A (MORGAN) 31 August 1989 Whole document	1-13
A	FR 2474106 A (GARIDEL) 24 July 1981 Whole document	1-13
A	DE 20312364 U (IWANEK) 9 October 2003 Whole document	1-13
☐ Further documents are listed in the continuation of Box C ☒ See patent family annex		
* Special categories of cited documents "A" document defining the general state of the art which is not considered to be of particular relevance "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "O" document referring to an oral disclosure, use, exhibition or other means "A" document member of the same patent family "P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 12 July 2005		Date of mailing of the international search report 21 JUL 2005
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address. pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929		Authorized officer SARAVANAMUTHU PONNAMPALAM Telephone No. (02) 6283 2070

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU2005/000779

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member
GB	2214239	IN 171965
FR	2474106	NONE
DE	20312364	NONE
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.		
END OF ANNEX		

PATENT COOPERATION TREATY

101

From the:
INTERNATIONAL SEARCHING AUTHORITY

To:

Fisher Adams Kelly
GPO Box 1413
BRISBANE QLD 4001

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

RECEIVED
 25 JUL 2005

Date of mailing (day/month/year) **21 JUL 2005**

Applicant's or agent's file reference
13291 PC2-PJD

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/AU2005/000779

International filing date (day/month/year)
1 June 2005

Priority date (day/month/year)
1 June 2004

International Patent Classification (IPC) or both national classification and IPC
Int. Cl. ⁷ **F03B 13/10, 13/12, 13/26**

Applicant
ATLANTIS ENERGY LIMITED et al

1. This opinion contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|--|
| ☒ | Box No. I | Basis of the opinion |
| ☐ | Box No. II | Priority |
| ☐ | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| ☐ | Box No. IV | Lack of unity of invention |
| ☒ | Box No. V | Reasoned statement under Rule 43bis 1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| ☐ | Box No. VI | Certain documents cited |
| ☐ | Box No. VII | Certain defects in the international application |
| ☐ | Box No. VIII | Certain observations on the international application |

FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66 1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220

3. For further details, see notes to Form PCT/ISA/220

Name and mailing address of the IPEA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
 E-mail address: **pct@ipaaustralia.gov.au**
 Facsimile No **(02) 6285 3929**

Authorized Officer
SARAVANAMUTHU PONNAMPALAM
 Telephone No **(02) 6283 2070**

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/AU2005/000779

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/AU2005/000779

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-13	YES
	Claims	NO
Inventive step (IS)	Claims 1-13	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-13	YES
	Claims	NO

2. Citations and explanations:

NOVELTY (N) and INVENTIVE STEP (IS)

A. The documents constituting the closest prior art are:

- (i) GB 2214239 A
- (ii) FR 2474106 A
- (iii) DE 20312364 U

B. The subject matter of claim 1 differs from these prior art documents in that a plurality of carriages that are movable around the track and at least one line member connected to the carriages. Further the line member is operatively connected power take-off to power the power take-off.

C. The distinguishing features of the invention will create less turbulence and hence resulting in increased efficiency.

D. Therefore the application satisfies the criteria set forth in PCT Article 33(2-3), concerning the novelty and inventive step of the independent claim 1.

E. The criteria concerning novelty and inventive step of claims 2-13 are satisfied because these claims are dependent on claim 1.

INDUSTRIAL APPLICABILITY (IA)

The invention defined in claims 1-13 satisfies the criterion set forth in PCT Article 33(4).

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

FISHER ADAMS KELLY
Level 13 AMP Place
10 Eagle Street
BRISBANE, QLD 4000
Australia

Date of mailing (day/month/year) 16 March 2006 (16.03.2006)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 13291PC2-PJD	
International application No. PCT/AU2006/000779	International filing date (day/month/year) 01 June 2005 (01.06.2005)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

ATLANTIS ENERGY LIMITED
Suite 16
221 River Street
MACLEAN, NSW 2463
Australia

State of Nationality

AU

State of Residence

AU

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

ATLANTIS RESOURCES CORPORATION PTE
LIMITED
5 Shenton Way
#2-02 UIC Building
Singapore
Singapore

State of Nationality

SG

State of Residence

SG

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☒ the designated Offices concerned
☐ the International Searching Authority ☐ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 338 87.40	Authorized officer Diana NISSEN (Fax 338 8270) Telephone No. (41-22) 338 8054
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PCT REQUEST

Original (for SUBMISSION)

0	For receiving Office use only	
0-1	International Application No	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form PCT/RO/101 PCT Request	
0-4-1	Prepared Using	PCT-SAFE [EASY mode] Version 3.50 (Build 0002.163)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Australian Patent Office (RO/AU)
0-7	Applicant's or agent's file reference	13291PC2-PJD
I	Title of invention	A SYSTEM OF UNDERWATER POWER GENERATION
II	Applicant	
II-1	This person is	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	ATLANTIS ENERGY LIMITED
II-5	Address	Suite 16 221 River Street MACLEAN, New South Wales 2463 Australia
II-6	State of nationality	AU
II-7	State of residence	AU
III-1	Applicant and/or inventor	
III-1-1	This person is	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	PERRY, Michael, David
III-1-5	Address	2 Neill Street LAWRENCE, New South Wales 2460 Australia
III-1-6	State of nationality	AU
III-1-7	State of residence	AU

PCT REQUEST

Original (for SUBMISSION)

III-2	Applicant and/or inventor	
III-2-1	This person is	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	GILMORE, Duncan, Bartlett
III-2-5	Address	16 Corella Avenue SAMFORD, Queensland 4520 Australia
III-2-6	State of nationality	AU
III-2-7	State of residence	AU
III-3	Applicant and/or inventor	
III-3-1	This person is	applicant and inventor
III-3-2	Applicant for	US only
III-3-4	Name (LAST, First)	HOPE, Raymond, Lindsay
III-3-5	Address	17 Chelva Street WISHART, Queensland 4122 Australia
III-3-6	State of nationality	AU
III-3-7	State of residence	AU
III-4	Applicant and/or inventor	
III-4-1	This person is	applicant and inventor
III-4-2	Applicant for	US only
III-4-4	Name (LAST, First)	CAMPBELL, Gary James
III-4-5	Address	192 Tanglewood Road LAWRENCE, New South Wales 2460 Australia
III-4-6	State of nationality	AU
III-4-7	State of residence	AU
III-5	Applicant and/or inventor	
III-5-1	This person is	applicant and inventor
III-5-2	Applicant for	US only
III-5-4	Name (LAST, First)	KRUGER, Melissa, Louise
III-5-5	Address	15 Princeton Street KENMORE, Queensland 4069 Australia
III-5-6	State of nationality	AU
III-5-7	State of residence	AU

PCT REQUEST

Original (for SUBMISSION)

III-8	Applicant and/or inventor	applicant and inventor US only KEATING, Carmen Patricia 6/231 Vulture Street SOUTH BRISBANE, Queensland 4101 Australia AU AU
III-8-1	This person is	
III-8-2	Applicant for	
III-8-4	Name (LAST, First)	
III-8-5	Address	
III-8-6	State of nationality	
III-8-7	State of residence	
IV-1	Agent or common representative; or address for correspondence	agent FISHER ADAMS KELLY Level 13 AMP Place 10 Eagle Street BRISBANE, Queensland 4000 Australia +61 7 3229 2655 +61 7 3221 0597 pdavis@fak.com.au
	The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	
IV-1-1	Name	
IV-1-2	Address	
IV-1-3	Telephone No	
IV-1-4	Facsimile No.	
IV-1-5	e-mail	
V	DESIGNATIONS	
V-1	The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.	
VI-1	Priority claim of earlier national application	01 June 2004 (01.06.2004) 2004902885 AU
VI-1-1	Filing date	
VI-1-2	Number	
VI-1-3	Country	
VI-2	Priority claim of earlier national application	12 October 2004 (12.10.2004) 2004905902 AU
VI-2-1	Filing date	
VI-2-2	Number	
VI-2-3	Country	

PCT REQUEST

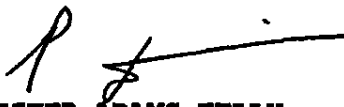
Original (for SUBMISSION)

VI-3	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1, VI-2	
VII-1	International Searching Authority Chosen	Australian Patent Office (ISA/AU)	
VII-2	Request to use results of earlier search; reference to that search		
VII-2-1	Date	05 July 2004 (05.07.2004)	
VII-2-2	Number	N/A	
VII-2-3	Country (or regional Office)	AU	
VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	-	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	
IX	Check list	number of sheets	electronic file(s) attached
IX-1	Request (including declaration sheets)	5	✓
IX-2	Description	13	-
IX-3	Claims	2	-
IX-4	Abstract	1	✓
IX-5	Drawings	21	-
IX-7	TOTAL	42	
	Accompanying items	paper document(s) attached	electronic file(s) attached
IX-8	Fee calculation sheet	✓	-
IX-17	PCT-SAFE physical media	-	✓
IX-19	Figure of the drawings which should accompany the abstract	2	
IX-20	Language of filing of the international application	English	

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PCT REQUEST

Original (for SUBMISSION)

X-1	Signature of applicant, agent or common representative	
X-1-1	Name	FISHER ADAMS KELLY
X-1-2	Name of signatory	PAUL J DAVIS
X-1-3	Capacity	Registered Patent Attorney

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/AU
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
------	--	--

13291PC2-PJD

1/1

PCT (ANNEX - FEE CALCULATION SHEET)

Original (for SUBMISSION)

(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only	
0-1	International Application No.	
0-2	Date stamp of the receiving Office	
0-4	Form PCT/RO/101 (Annex)	
0-4-1	PCT Fee Calculation Sheet Prepared Using	PCT-SAFE [EASY mode] Version 3.50 (Build 0002.163)
0-9	Applicant's or agent's file reference	13291PC2-PJD
2	Applicant	ATLANTIS ENERGY LIMITED
12	Calculation of prescribed fees	fee amount/multiplier Total amounts (AUD)
12-1	Transmittal fee T	⇒ 100
12-2-1	Search fee S	⇒ 1200
12-2-2	International search to be carried out by AU	
12-3	International filing fee (first 30 sheets) I1	1525
12-4	Remaining sheets	12
12-5	Additional amount (X) 16	
12-6	Total additional amount I2	192
12-7	I1 + I2 = I	1717
12-12	EASY Filing reduction R	-109
12-13	Total international filing fee (I-R) I	⇒ 1608
12-14	Fee for priority document	
	Number of priority documents requested	2
12-15	Fee per document (X) 50	
12-16	Total priority document fee P	⇒ 100
12-17	TOTAL FEES PAYABLE (T+S+I+P)	⇒ 3008
12-18	Mode of payment	cheque

111 I

- An underwater power generation system comprising at least one continuous track; a plurality of carriages that are movable around said track; at least one foil attached to each of the carriages, said foils able to be driven by a water current; at least one line member connected to the carriages; at least one power take-off operatively connected to said line member; wherein the driven foils cause the carriages to move around said track and hence cause movement of said line member to power said power take-off.

()

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Expediente No		No de Folio
Item	No de unidades	
1	CD	
2	DVD	
3	REVISTA	
4	LIBRO	
5	PERIODICO	
6	DISQUETES	
7	SOBRE DE MANILA	✓
8	SOBRE BLANCO TAMAÑO CARTA	
9	SOBRE BLANCO TAMAÑO OFICIO	
10	OTROS:	

Observaciones:

Ate final

114

#

REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCI

Bogotá,
2020

Doctor(a)
RODRIGUEZ DILIA MARIA
Apoderado(a) y/o Representante de
ATLANTIS RESOURCES CORPORATION PTE. LIMITED.

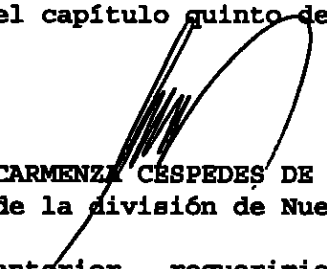
REFERENCIA	Radicación No.	6 123110
	Solicitud internacional	PCT/AU2005/000779
	Fecha inicio fase nacional	01/01/2007
	Trámite	11
	Evento	379
	Actuación	430
	Oficio No.	833

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante. (Art. 26-k) Decisión 486.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Unica No.10 de 2001.


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de fecha 26.ENE 2007
adpall