序号	标题	摘要	申请人	申请号	申请日
1	A new thermal buoyancy engine and its control method	The thermal buoyancy engine system includes a pressure vessel 18, a high-low hydraulic pressure conversion unit in the pressure vessel, a heat exchanger 1 connected to the high-low hydraulic pressure conversion unit, outer oil bladder 4, inner oil bladder 17, and accumulator 11. There may be phase change material (PCM) in the heat exchanger and hydraulic oil in the phase change material. The high-low hydraulic pressure conversion unit may include a single-acting low-pressure cylinder 7 and a double-acting high-pressure cylinder 10 with fixed relative positions, a hydraulic rod 8 between the cylinders and a carrying bracket 19 for fixing the cylinders. The double-acting high-pressure cylinder may be connected with the inner oil bladder and the accumulator, which may contain high-pressure nitrogen. The design of the high-low hydraulic pressure conversion unit of the invention can effectively achieve the conversion of the hydraulic oil from high pressure to low pressure, so as to achieve the increase of the buoyancy change capability. A method of operating the system is also disclosed.	UNIV STRATHCLYDE	GB2010890	2020/7/15
2	Ocean heat power plant	An assembly and cyclic method for generating electricity from a temperature difference e.g. OTEC, comprising, a reaction chamber 401 for forming a hydrate from a carrier gas e.g. nitrogen, argon, ethane, methane, and a water-based fluid e.g. seawater, a first column 403 for dissociating the hydrates back into the carrier gas comprising first and second portions at upper and lower temperatures, a mechanical device 402 e.g. a one/two way displacement pump and/or a flow regulating device, connecting the first column to the chamber, a generator 405 connected to the first portion (optionally via an expansion valve), and a second column 406 connected to the outlet of the generator and the inlet of the reaction chamber. The columns may be symmetric about a longitudinal axis and comprise a 6000 series aluminium. The first column may comprise radially extending members and/or a flexible portion connecting the first and second portions. The assembly may comprise a metallic filter. The second column may be at a pressure greater than the chamber but lower than the first column. The first column may comprise first, and second longitudinal section connected to upper and lower reservoirs.	EQUINOR ENERGY AS	GB2004734	2020/3/31

3	Differential pressure power generator	A power generation and storage system 2 includes a vortex tube 12 with an inlet 8 for receiving a pressurised fluid. The vortex tube 12 separates the fluid into a hotter portion supplied to a hot output 18, and a colder portion supplied to a cold output 16. A thermoelectric generator 24 is in thermal communication with the hotter and colder fluids, and generates electrical power from the temperature difference. An electrical energy storage device 28 is charged by the electrical power generated by the thermoelectric generator 24.	OXFORD FLOW LTD	GB1913401	2019/9/17
4	Sunlit train	An undersea tunnel suitable for electromagnetic trains is floated in the epipelagic zone. The tunnel is manufactured from layers of steel wire and is connected to vertical telescopic energy platforms. Energy is produced from the temperature differential between the ends of the tunnel, wind power, wave power and tidal power. The tunnel may be used to route fibre optic and power cables as well as well as water pipes.	BNDEAN ABDULKADIR OMER	GB1812177	2018/7/26
5	Thermoelectric generator	An apparatus for generating electricity. The apparatus comprises a collar arranged to couple to a pipe and a support having a first planar face, the support being attached to the collar such that it projects away from the collar. The apparatus also has at least one thermoelectric generator attached to the first planar face of the support and a cover attached to the at least one thermoelectric generator.	EXNICS LTD	GB1608784	2014/11/14
6	Iceberg bags	A device for transporting icebergs, comprising an insulated bag wherein an insulating layer comprises a liquid or slurry with less than 95% (w/w) water. Said insulating layers may comprise a mixture of a woody material, such as sawdust, and water, for example, pykrete. Also disclosed is a process for transporting an iceberg enclosed by the device, and a method of making such a device.	ABDULLA MOHAMED ALSHEHHI	GB1811440	2018/7/12

7	Subsea pipeline buoyancy module	A subsea pipeline buoyancy module 2 comprising monitoring apparatus 4 to monitor a condition or parameter of the buoyancy module. The monitoring apparatus is accessible for e.g. data storage removal by a subsea diver or a ROV via e.g. a pod hole 8 with funnel entry 12 closed by a plug 14 to protect from marine life, and includes a power supply 26 or power generation unit and sensors 20. The monitoring apparatus can monitor a condition or parameter of the buoyancy module on land, during subsea testing, and/or during subsea use, such as depth, temperature, salinity, foam curing, slamming load, motion, pressure, acoustic, optical, visual, stress, strain, tension. The power source may be one of a water activated, induction rechargeable and an LiSi/CoS2 battery, a seawater cell, an open or ducted turbine or a fin generator. The sensors may involve Surface Acoustic Wave array, a time lapse camera, or an attitude sensor. The module may be a two half-shell type joined by a metallic or elastomer clamp which may be monitored for condition.	TECHNIP FRANCE	GB1705433	2017/4/4
8	Magnetic phase transition exploitation for enhancement of electromagnets	An electromagnet can be used to provide a controlled magnetic field, for example for the purpose of minesweeping. The electromagnet is constructed of a material which has a Curie temperature, such that the electromagnet can be stored at a temperature above the Curie temperature, but deployed below the Curie temperature in use.	THALES HOLDINGS UK PLC	GB1608685	2016/5/17
9	Platform	A floating housing for Ocean Thermal Energy Conversion (OTEC) units comprises a platform with buoyant ballast tanks 4 and a mooring system 8. The platform has a number of slots 9 into which the individual OTEC units may be fitted. A common inlet hose 2 draws cold water from the depth of the ocean for the units, and a common outlet hose 3 vents used water back to the ocean. The outlet hose contains a turbine (not shown), which produces electricity. In a second embodiment an OTEC unit is fitted with a ballast tank and a winch attached to a mooring line, providing a standalone floating unit or a group of units without an associated platform.	EDWARDS DOUGLAS	GB1614524	2016/8/25

10	Water power platform	A cold water supply for Ocean Thermal Energy Conversion system comprises a turbine driven pump located on a submerged platform. Fluid to drive said system is supplied through a plurality of hoses. The hoses may be under a positive pressure thus obviating the need for rigid pipework. The platform may be buoyant and may be tethered above the seabed by a series of anchor cables. The deep water may be transferred to a ship via a single point mooring system. The use of turbine driven pumps avoids the need to use electric motors on the submerged platform.	DOUGLAS EDWARDS	GB1516307	2015/9/15
11	Water power	A cold water supply for an Ocean Thermal Energy Conversion (OTEC) system comprises a turbine driven pump at the base of a cold water hose. Fluid for driving the turbine is supplied via a second hose. Because water is pumped from the base of the pipe, it is under positive pressure so a flexible hose can be used in place of a conventional Cold Water Pipe (CWP). The use of a turbine driven pump avoids the need to use an electric motor at the base of the pipe.	EDWARDS DOUGLAS; RE SYSTEMS LTD	GB1507992	2012/6/25
12	Water delivery system	An apparatus, system, and method for raising water using containers is provided. The system includes a first frame ascendable and descendible within a body of water. At least one container is connected to an elongated cable, wherein the elongated cable is connected to the first frame, wherein two free ends of the elongated cable are connectable together when the first frame is in a descended position within the body of water. The system may include an Ocean Thermal Energy Conversion (OTEC), Low-Temperature Thermal Desalination (LLTD), and/or Seawater Air Conditioning (SWAC) system, among others.	EDWARDS DOUGLAS	GB1506647	2013/12/6

13	Improved compressed gas cylinder	An electronic gauge for use with a compressed gas cylinder for determining the time remaining until substantially all gas in the cylinder is depleted comprises : one or more processing units adapted to receive gas pressure measurements from a gas pressure sensor and temperature measurements from a temperature sensor; and a display interface in communication with the one or more processing units and adapted for communication with a display, wherein the one or more processing units are adapted to perform software instructions for : i) determining a plurality of gas remaining values for the amount of gas remaining in the compressed gas cylinder each gas remaining value being based on a plurality of gas pressure measurements and one or more temperature measurements, and ii) determining a time remaining until substantially all gas in the compressed gas cylinder is depleted based upon at least two of the determined gas remaining values for communication to a display via the display interface, wherein, when determining the time remaining until substantially all gas in the cylinder is depleted, the one or more processing units are adapted to use at least two gas remaining values determined using gas pressure measurements recorded within a variable time period, the at least two gas remaining values differing by at least a predetermined gas difference threshold. A method of calculating time remaining until substantially all gas in a compressed gas cylinder is depleted is also claimed. The calculation of the time remaining performed by the electronic gauge reduces the effect of errors and noise.	LUXFER GAS CYLINDERS LTD	GB1319373	2013/11/1
14	System and process of cooling an OTEC working fluid pump motor	An Ocean Thermal Energy Conversion (OTEC) system includes a working fluid pump 114 mounted below the water surface in a pressure vessel 10. The sub-cooled working liquid from the working fluid pump 114 outlet is used to cool the working fluid pump motor 22, either directly (figure 3) or indirectly via heat exchange 30 with a secondary fluid in a separate circuit 32. The heat from the motor 22 is rejected into the working fluid just before the evaporator (110-1, figure 1) and so is thermodynamically beneficial. Also, because two-phase evaporators, such as those in an OTEC system, are less efficient than single-phase heat exchangers at single-phase heating, this pre-heating of the working fluid 108 will improve evaporator performance substantially.	LOCKHEED CORP	GB1404272	2014/3/11

15	Further addtions 2	An apparatus, system, and method for raising water using containers is provided. The system includes a first frame ascendable and descendible within a body of water. At least one container is connected to an elongated cable, wherein the elongated cable is connected to the first frame, wherein two free ends of the elongated cable are connectable together when the first frame is in a descended position within the body of water. The system may include an Ocean Thermal Energy Conversion (OTEC), Low-Temperature Thermal Desalination (LLTD), and/or Seawater Air Conditioning (SWAC) system, among others.	EDWARDS DOUGLAS; RESYSTEMS LTD	GB1222141	2012/12/10
16	Cold water retrieval system using containers	A system for raising water from within the sea, especially for use in ocean thermal energy conversion (OTEC) systems, Mari culture, hydrogen production or low temperature desalination, comprising a cable suspending a container which has a contractible section or a snorkel so that when the container is emptied a vacuum is not created. The contractible section may be a membrane forming a syringe which is driven by a motor or by pumped water filling the container. The containers may be removed from the cable when they are being emptied to allow other containers to raise water at the same time. Alternatively the container may remain attached to the cable and empty its water into an extractor case. When the container is being emptied of cold water the opposite side of the membrane may be filled with brine or waste water to reduce the parasitic drag of the system.	EDWARDS DOUGLAS	GB1118550	2011/10/27

17	Offshore marina formed from a number of interconnected ships	Land next to the sea is generally built-up and development land there is often too expensive or unavailable. The application proposes to create development platforms at sea, an example of which is formed by bringing together six ships to form a hexagon structure, the prow 3 of one ship designed to be firmly fixed to the rear of the neighboring ship. One of the ships is provided with an opening 8 such that boats can enter a central harbor 6. Within the area enclosed by the hexagonal structure a number of inner platforms are also provided to form accessible deck space that acts as a Piazza. Each ship is composed of a hull 1 which provides the flotation and large rooms, and a superstructure 2 where apartments, hotels, ground floor shops and public spaces are planned. Since the life of conventional hulls is around 50 years, a system is provided by which the superstructures can be slid from an old or damaged hull to a new hull brought alongside.	MICHAELIS DOMINIC	GB1100823	2011/1/18
18	Structural ice composite body with thermal conditioning capability	The invention relates to an ice composite body 10 comprising a constrained inner ice core within a protective outer armour shell having a base 13 and side sections 14 with a waterproof liner, and a separate top armour shell section 15 which is able to move freely vertically between the side sections. The constrained inner ice core comprises an upper structural ice core 11 always maintained in a solid state, and below the structural ice core, a separate lower ice core 90 comprising a layer of ice 94 and a permanent liquid water layer 91 connected to a water supply. The water supply is connected to a means for controlling the pressure of the water supply to pressurize the ice core from within the shell at a pressure to support the separate top section of the armour shell, any weight resting on the top section of the armour shell, the upper structural ice core and lower structural ice core layers. Also included is a means 92 of melting and refreezing the lower structural ice core. The pressurization system results in a more reliable structural support system for the top part of the shell. The melting & freezing of the lower ice core can be used to shift air-conditioning demand from daytime peak to nighttime off-peak, without affecting the structural support system for the top section of the armor shell used to support equipment, traffic, buildings or for other purposes involving a load, or the capacity of the ice body to provide heating using the heat from a refrigeration system for the structural ice core.	MCALISTER PADRAIG	GB1112474	2011/7/20

19	Method of carbon sequestration	The present invention relates to methods and apparatus for robust and long-term sequestration of carbon. In particular, the present invention relates to sequestration of carbon as carbonates, using coccolithophorid algae grown using land-based aquaculture. The invention also relates to improved methods of Ocean Thermal Energy Conversion (OTCE).	JOVINE RAFFAEL	GB0819865	2008/10/29
20	Wave energy converter with flexible membrane supporting solar energy converters	A wave energy converter uses a flexible membrane 11 at the ocean surface which is connected to the seabed and/or to a submerged membrane 15 so that wave movement generates energy e.g. by powering a hose pump or piston pump. The pressurised water may be supplied to an electricity generator or reverse osmosis desalination equipment. The membrane 11 caries solar energy converters which may be photovoltaic, photothermal or photobiological. A part spherical concentrating reflector may be used which is able to maintain its orientation despite fluctuations of the membrane (figure 8).	MICHAELIS DOMINIC	GB0901780	2009/2/4
21	Tide powered pump	A tide powered pump has a floating platform 1 supported by a piston and cylinder arrangement 5, 4. Movement of the platform 1 pumps fluid which may be used for energy or resource production. The platform may be used as a base to support, for example, other types of energy generator. The pumping chamber may comprise a compressible vessel instead of the piston and cylinder arrangement (figure 8). The device may also be used in other areas of variable water level, such as on land subject to periodic flooding.	HATCHWELL PAUL KRISTIAN	GB0803903	2008/2/29
22	Low level pumped OTEC cold water pipe	A cold water pipe for Ocean Thermal Energy Conversion (OTEC) applications has pumps located at the low level base of the pipe, so that the pipe contains pressurized water. The pipe is therefore free from the danger of collapse under negative pressure, and can be made with thinner walls, or flexible materials.	MICHAELIS DOMINIC	GB0803919	2008/3/3
23	Tidal pump system	A water powered pump is actuated by variable water levels (e.g. tidal energy). The pump may pump water between different depths within the water, e.g. to adjust nutrient levels or temperature, or it may pump fluids or fluent solids to or from the water e.g. to provide materials, or to store gasses below water. The system may also spray liquids above the water surface to encourage cloud formation. The pump may be used for power generation, or water of different temperatures, moved by the pump, may be used in a heat engine to provide power.	HATCHWELL PAUL KRISTIAN	GB0800521	2008/1/11

24	Marine platform formed with tetrahedral structures.	Marine platforms are used in many applications, in particular relating to oil and gas exploitation. It is proposed that platforms are built to consist of a deck 10, supported by a tetrahedral triangulated structure 1, 2, 4, 5. The tetrahedral triangulated structure provides great strength and offers very little resistance to oncoming waves, taking the deck loads down below the areas most affected by the waves. Supporting the tetrahedral triangulated structure are profiled buoyancy vessels 7 whose air content can be varied to lower or raise the platform according to wave heights, including those of rogue waves. This guarantees the safety of people and equipment on the deck in all weather conditions. The platform may be adapted to support energy conversion systems, equipment, buildings, housing, plantations, heliports, landing strips, harbour quays, swimming pools and beaches.	MICHAELIS DOMINIC	GB0725365	2007/12/29
25	Using existing oil and gas drilling platforms for the conversion of renewable energy sources	Existing oil and gas platforms 1 are used as a base for equipment adapted to convert renewable energy sources into usable power. Existing platforms are well established and engineered to face the heavy sea conditions they may encounter and provide a cost effective solution to the problem of providing a base for marine renewable energy converter systems. Converter systems including geothermal energy converters, ocean thermal energy converter systems 15, wave energy converters (21, Fig 2), sea current turbines (60, Fig 5), wind turbines (24 and 25, Fig 2), solar energy collectors (22 and 23, Fig 2) and salinity gradient converters may be installed on or alongside existing platforms during or after use in fossil fuel drilling. Re-use of the platforms also eliminates the cost of decommissioning platforms after fossil fuel drilling.	MICHAELIS DOMINIC	GB0516480	2005/8/11

26	Marine vessel power system	The present invention provides a power system that has particular application in marine vessels. The power system includes a first ac Generator 2a that is connected to a first ac busbar 4a for distributing power. A second ac busbar 4b for distributing power is connected to the first ac busbar 4a by a mid-bus transformer 38a that does not require a phase shift and can have a relatively low rating compared to the transformers that are used in known power systems having a similar arrangement. A power converter 12a is connected to the first ac busbar 4a and is used to interface with an ac motor 10a. A second generator 2b is connected to the second ac busbar 4b. The power converter 12a and ac motor 10a can be supplied with power directly from the first ac busbar 4a or from the second ac busbar 4b via the mid-bus transformer 38a.	CONVERTEAM LTD	GB0700260	2007/1/6
27	Ocean thermal energy conversion	An open cycle ocean thermal energy conversion (OTEC) plant generates electricity and desalinated water. The plant comprises an inner chamber (shell) 2 surrounded by an outer chamber 1, one of the chambers containing a vacuum. Relatively warm ocean water is pumped into the vacuum containing chamber where it is evaporated, the vapour passing through a turbine 20, which generates electricity, to the other of the chambers where it is condensed into desalinated water using relatively cold ocean water. The chambers 1, 2 may be spherical in shape. Part of the generated electricity maybe used to produce hydrogen. The plant is located on a floating platform 3 which is supported by pressure ballasted hollow columns 4 which allow it to rise and fall as required. A pipe (50, figure 2) supplying the relatively cold ocean water is separately buoyed and moored, and is linked to the platform 3 by telescopic flexible tubing (57, figure 2). A plankton control device may be fitted to the plant which allows plankton to be brought to the ocean surface for fish farming.	MICHAELIS DOMINIC	GB0624822	2006/12/13

28	CO2 scrubber monitor	A scrubber life indicator for a rebreather including a plurality of temperature sensors 29 from which a proportion of the integral temperature rise is measured to indicate scrubber life or life remaining. Preferably the temperature gradient is measured and analysed to indicate scrubber health. The scrubber operation may be divided into a multiple phases to track the position of the maximum temperature, take the average temperature of selected sensors and monitor the gradient. The temperature readings may be scaled as a function of depth, starting temperature, thermal capacity of the gases, flow rate, ambient temperature, humidity and moisture. The sensors near the output may be closer together and the sensors on the inlet may comprise an array. The sensors may be automatically calibrated. Compensation may be made for the thermal mass of oxygen or helium. The results may be displayed 19, computed 53 and stored in memory 52.	DEAS ALEX	GB0512509	2005/6/18
29	Ocean thermal energy conversion condenser	The Ocean Thermal Energy Conversion (OTEC) system comprises a condenser 20, eg formed of radial finned-tube heat exchangers, which is located in deep cold waters, to which the vaporised working fluid (eg ammonia) vapour, having driven a surface-mounted turbo-generator 11, is transferred down an insulated conduit 12. The condensed fluid runs into a sump 21 from which it is pumped up by a pump 22 back to the surface, where heat exchangers 15, eg on a platform 10, expose it to surface water heat. The vapour drives the turbo-generator 11 and is returned again to the condenser, to complete the cycle. The condenser may be located at the lower end of a tube containing linking pipework and machinery serving as access and as guide to raise the condenser to the surface for maintenance. In a modification, fig.4, the condensed working fluid is pumped up via a series of pumps 22 and a series of break tanks linked by an air pipe 40, avoiding the huge pressure of the whole column. The deep location of the condenser obviates the cost and inefficiency of the convention long cold water pipe and causes less environmental disturbance.	MICHAELIS DOMINIC	GB0227861	2002/11/29

30	Subsea power supply	The present invention discloses a subsea power system for use in capturing "free" or "waste" energy (e.g., thermal, geothermal, pressurized subsurface gases or liquids, wind, wave, solar, or other free, waste, or low cost energy sources) to convert and/or store to power a subsea service or device during times when the free or waste energy supply is not as abundant, is not available, or demands require greater output than is provided at steady state. The subsea power system may include : (1) one or more energy-capturing devices -- such as a turbine and/or thermoelectric generator --for harvesting free or waste energy, (2) a fuel cell, electrolyzer, and oxygen and hydrogen storage vessels for harvesting energy from the surrounding seawater, and (3) a power converter for receiving energy from the various sources and converting the energy into a useful form consumable by subsea devices.	SCHLUMBERGER HOLDINGS	GB0513340	2005/6/30
31	Platform provided with renewable energy converter systems	A moored floating or shore-based platform 11 is provided with a plurality of different renewable energy converter systems. The systems may include wave energy converters 12, wind generators 14 and 15, solar collectors (20, Fig 4), sea current turbines 16 and ocean thermal energy converters. The power generated by the systems may be cabled to nearby power grids or may be used in the hydrolysis of water to form oxygen and hydrogen for fuel cells. The platform may be hexagonal in plan view and several platforms may be joined to form a larger integrated structure (Fig 7). The platforms may provide facilities (29, Fig 5) for fish farming and may incorporate housing 35, warehousing and industrial units. A raft of joined platforms may be used for coastal protection and/or as a harbour for ships 34.	MICHAELIS DOMINIC	GB0200579	2002/1/11

32	Carbon dioxide scrubber for breathing apparatus	An aspect of the invention provides a carbon dioxide scrubber for breathing apparatus (11 fig 1) of the type in which exhaled gas is passed through a body of re-agent material for removal of at least a proportion of the carbon dioxide content from the exhaled gas prior to or following injection of a determined quantity of oxygen or a mixture of oxygen and other gases to the gas and presentation of the gas for re-breathing. The apparatus comprises a plurality of temperature sensors 70 disposed in or adjacent to the re-agent material 39 for measuring the temperature difference between at least two locations during carbon dioxide removal by the filter. A processor means 76 is provided for determining the remaining carbon dioxide absorbing capacity of the remaining active re-agent material in accordance with the measured temperature difference from the sensors. Also disclosed is a method of determining the remaining CO 2 absorbing capacity of a reagent material.	PARKER MARTIN JOHN; PARKER DAVID	GB0128732	2001/11/30
33	Converting thermal energy of a natural water source into useful power	A water transfer vessel 3, travels between a station 2, on the surface of the ocean, and the ocean depths, where the vessel collects cool water and subsequently brings it to the surface. The station has reservoirs 4, 16 from which cool and warm water is supplied respectively to a condenser 5, and an evaporator 8, of a low boiling point fluid circuit incorporating a heat engine (turbine) 11. Warm exhaust water is discharged via the vessel 3 at the ocean depths. A single transfer vessel 3, may be used (figure 1) and the or each vessel may be propelled between levels by a variety of means including propellers, water jets, cables or chains, buoyancy control, and impulse drive (piston or catapult). Alternatively the vessel may be propelled along the surface between an offshore location and a land based energy conversion facility (figure 20).	FOTHERGILL IAN ROBERT	GB9707209	1997/4/9

34	Cable winding apparatus with clamp	A cable winding apparatus 2 comprises a rotatable member 3 which provides means for simultaneously winding on and off lengths of a portion of a cable 1 and means to anchor a portion of the cable intermediate its ends to the rotatable member. The anchoring means may comprise a two part clamp 34 of generally annular shape which has helical grooves on its inner surface of a size and pitch to interfit closely with turns of cable wound around the drum. The apparatus may form part of marine steering equipment so that the clamp preventing the cable slipping gives a constant relationship between the helm wheel and the position of the rudder.	WHITLOCK MARINE STEERING COMPANY LIMITED	GB9615887	1996/7/29
35	Cooling system	Disclosed is a cascade cooling system 10 for refrigeration or air-conditioning, comprising a vapour-compression cooling circuit 100; a brine circuit 200 thermally coupled to an evaporator 150 of the cooling circuit; and a coolant circuit (300) having a column (310) accommodating and thermally engaging a compressor assembly 110 and a condenser 120 of the cooling circuit. The coolant circuit 300 is also connected to a heat storage tank 400 for absorbing heat by the coolant and temporarily storing the same as latent heat in the tank 400. The coolant has aqueous ammonia and endothermic salt components, such as ammonium nitride or urea, to provide excellent cooling by the joint effects of evaporation and endothermic dissolution. The column 310 has baffle means (116, 315, not shown) for stabilising an axial temperature gradient, and flow guide means (312) for circulating endothermic salt. The antifreeze in the circuit 200 is also used as a cold storage material when the system 10 is switched by a unit 500 to a cold storage mode. Thermoelectric means (112, 610) are used at key positions in both the coolant circuit 300 and the antifreeze circuit 200 to improve operation flexibility and efficiency. Also disclosed is a method for selectively control the system operation according to whether a low-cost electricity is available, to further maximise the efficiency.	ZHANG WEI MIN	GB9506835	1995/4/3

36	Thermal power device	A thermal power device uses optical focussing means (eg lens or mirror) to focus radiant emission from a first heat sink onto a second heat sink, and then utilises the temperature differential between the second heat sink and a third heat sink to generate a non-thermal power output. In some forms of the device (figs 1 & 2) thermoelectric elements are used to generate an electrical output. In other forms of the device (figs 3 and 4) heat engines are used to generate the power output. In one form, heat H is supplied to a reverse heat engine 23 and the optical radiation converter 20 is connected by fluid conduits to the engine 23, heat store 21, and a stirling engine 19. Electrical power produced in the converter 20 is conveyed to an electrical power system 22 which may power the engine 23. Engine 23 may alternatively be driven by the engine 19.	ASPDEN HAROLD	GB9023438	1990/10/29
37	Description and applications of an easy disconnect, motion decoupling top joint for OTEC	The new joint which is illustrated in fig. 5 is designed to stop any motions from the top platform being transmitted to the CWP. In very bad weather when there is a danger of damage to the platform and/or the CWP, the CWP can easily be lowered below the surface of the sea where it is no longer exposed to such severe environmental conditions. The new joint can be beneficially applied to a ring semi submersible top platform whose design is optimised for minimum wind and wave induced motions. A laser welded sandwich construction of the CWP is proposed with syntactic foam placed between the inner and outer rings of the sandwich construction. The foam would make the pipe positively buoyant and it would be held in place by tension moorings attached to the sea bed similar to those used in tension leg platforms. (TLPs).	BROWN MARTIN GILES	GB8821094	1988/9/8

38	Waste disposal	According to the present invention, flowable solid waste material is loaded into the tanks of a large ocean going tanker 1, transported therein to a deep water site, and then deposited directly onto the seabed at that site through piping deployed from the vessel and extending downwardly therefrom. The piping maybe a flexible hose (e.g. plastics tubing in continuous or segmented form 32), or as string of steel pipes, or a combination of the two. The piping may be deployed over the side of the vessel, or preferably from a moon pool 9. The depth of the seabed for deposit might for example by one thousand or fifteen hundred metres, or considerably deeper, e.g. 7000 m; in extremely deep water it may be not be necessary for the piping to extend fully to the seabed, although it is recommended that it extend at least below the depth at which the majority of fish are found (the "fish line") and below the depth where there are significant thermal changes. The invention not only provides a disposal procedure but also the disposal tanker per se, provided with a hose reel and/or pipe erection plant and/or equipment for handling piping 34, 36, 38 and for deploying the disposal piping 32 from the tanker to the deep seabed disposal region.	THE * MAERSK COMPANY LIMITED; GENERAL ENVIRONMENTAL TECHNOLOGIES LIMITED	GB8714883	1987/6/25
39	SEWAGE DISPOSAL	Treated sewage is loaded into the tanks of a large ocean-going tanker, transported therein to a deep water site, and then deposited directly onto the seabed at that site through piping deployed from the vessel and extending downwardly therefrom. The piping may be a flexible hose, or a string of steel pipes, or a combination of the two. The piping may be deployed over the side of the vessel, or preferably from a moon pool. The depth of the seabed for deposit might for example be one thousand or fifteen hundred meters, or considerably deeper, e.g., 7000 m; in extremely deep water it may not be necessary for the piping to extend fully to the seabed, although it is recommended that it extend at least below the depth at which the majority of fish are found and below the depth where there are significant thermal changes. The disposal tanker is provided with a hose reel and/or pipe erection plant and/or equipment for handling piping and for deploying the disposal piping from the tanker to the deep seabed disposal region.	GENERAL ENVIRONMENTAL TECHNOLOGIES LIMITED; THE * MAERSK COMPANY LIMITED	GB8700105	1987/1/6

40	SOLAR HEATING OF BODY OF WATER	A method and a system of solar heating of water, which has its surface exposed to air and radiation from the sun, by covering the surface of the body of water with a floating blanket consisting of thousands of coverites. Each coverite (10, 11) is a sealed bag with its wall (12) comprising a thin translucent film of plastic, which encases a translucent liquid (13) and a translucent gas (14), so that each coverite presses against its neighboring coverites, whereby its thin flexible wall conforms to the shape of the contacting part of the neighboring coverites' thin flexible walls, whereby the resulting blanket of coverites admits the solar radiation to reach the water (15), and reduces heat absorbing evaporation of the water (15) to the air (17), and thermally insulates the water from the air. The liquid (13) and the gas (14) may conveniently be water and air respectively and the plastic may suitably be a polyolefine such as polyethylene.	SORENSEN JENS OLE	GB8216966	1982/6/11
41	Generation of energy by means of a working fluid and regeneration of a working fluid	A gaseous working fluid is expanded from a charged high pressure level to a spent low pressure level to release energy and the working fluid is regenerated by, in at least one regeneration stage, condensing the working fluid in an absorption stage (A) by dissolving it in a solvent solution while cooling with a cooling medium, the solvent solution comprising a solvent having an initial working liquid concentration which is sufficient to provide a solvent solution boiling range suitable for absorption of the working fluid; increasing the pressure of the solvent solution containing the dissolved working fluid by means of a pump (P) and evaporating the working fluid being regenerated by heating in an evaporation stage (E); withdrawing the evaporated working fluid for expansion in turbine 52 to release energy; and recycling the balance of the solvent solution remaining after evaporation of the working fluid, to constitute the solvent solution for the absorption stage of that regeneration stage. The preferred working fluid is ammonia, the solvent is water and the heat source is ocean thermal energy.	KALINA ALEXANDER ISAEVITCH	GB8114927	1981/5/15

42	POSITIONING SYSTEM FOR A WATERBORNE VESSEL CONTAINING AN OCEAN THERMAL ENERGY CONVERSION APPARATUS	A dynamic positioning system for a sea-going vessel containing an ocean thermal energy conversion (OTEC) system utilizes the thrust produced by the sea water effluents resulting from the energy conversion process to position the vessel against wind and ocean current forces. In one preferred embodiment applicable to both cylindrical surface and spar buoy types of vessels, both the warm water and cold water discharges are collected in a common annular plenum and then discharged through nozzles spaced angularly around the periphery of the plenum. Each nozzle is rotatable through a 90 DEG arc in a vertical plane to alter the direction of the discharge water jet and thereby to alter the horizontal component of the thrust or the driving force acting upon the vessel. The nozzles may be selected as to location and angular orientation to attain the net resultant force vector necessary to provide station-keeping or propulsion to the vessel under most any combination of wind and ocean current conditions.	TRW INC	GB7716908	1977/4/22
43	LIQUEFIED GAS CONTAINERS	1531174 Insulation CONCH INTERNATIONAL METHANE Ltd 2 May 1977 [13 July 1976] 18338/77 Heading F4P Insulation panels 8 are mounted within a container 13 by lips 12 on the panels engaging adjustable flanges 17 threaded on studs 14, the gap between adjacent lips 12 being sealed by elongate strips 19 secured by nuts 18. The space 21 between adjacent panels is filled with insulating material and the space sealed by a strip 22. The panels 8 preferably comprise a balsa frame closed by plywood sheets 10, 11 and filled with foamed plastics or glass fibre.	CONCH INT METHANE LTD	GB7718338	1977/5/2

44	METHOD OF AND APPARATUS FOR UTILLISING ENERGY FROM SUBTERRANEAN GEOTHERMAL SOURCES	1519565 Utilizing geothermal energy; heat exchange elements SPERRY RAND CORP 29 March 1977 [6 April 1976] 13120/77 Headings F4U and F4S In apparatus for utilizing geothermal energy for the production of electricity, hot brine is pumped up an annular channel 126 within a well casing 125 to an outlet channel 132 leading to a re-injection well 133. The brine is pumped by means of a pump 172 driven by a turbine 171, the organic working fluid for which is heated to the supercritical state as it passes down the annular channel 124 by thermal transfer from the hot brine through the wall 123. After driving the turbine, the fluid is returned upwardly through a conduit 122 with a thermally insulating pipe 121 to drive a turbine 101 connected to an electricity generator 102. The fluid then passes through a condenser 109 before returning to the channel 124. The wall 123 is provided with internal and external fins which increase in number and area from the bottom of the well to provide an increasing heat exchange area, Figs. 6-10 (not shown).	SPERRY RAND CORP	GB7713120	1977/3/29
45	HYDRAULIC POSITION-CONTROL TELEMOTOR APPARATUS	1518931 Telemotor systems A W BARKER 1 Aug 1975 [7 Aug 1974] 05769/74 Heading F1P A telemotor position control system especially for steering a water craft comprises a master unit (Fig. 1) having a displaceable cylinder 2 which is moved by a steering wheel (not shown) via a pinion 16 and rack teeth 15 and a slave actuator (Fig. 3) having a double acting piston 41 and working chambers 49, 50 respectively connected to working chambers 9, 8 of the master unit. The cylinder 2 slides in a casing 1 and has a valve assembly 31 which acts as a bleed valve and closes communication, via two ducts 28, 29, between the working chambers 8, 9. The slave unit may be mounted on a craft's transom by an adjustable mounting bracket 57 which is slidable along a tube 53 through which a piston-rod 42 extends with its free end connectable to a rudder (not shown). The telemotor system is charged with hydraulic fluid from a reservoir (not shown) which is connected across the connections between the master and slave units. The hydraulic fluid in the reservoir is maintained under pneumatic pressure for charging the hydraulic circuit. Air is purged from the circuit via the valve 31 and bleed valves 81 on the slave unit.	BARKER A W	GB7405769	1975/8/1

46	LIQUEFIED GAS TANKERS	1440318 Marine propulsion using vaporized cargo CONCH INTERNATIONAL METHANE Ltd 5 Dec 1973 [8 Dec 1972] 56870/72 Headings B7A and B7V A liquefied gas cargo vessel has a system for augmenting the natural boil-off rate of the cargo. The system comprises an ejector 11 having a chamber 12 housing a Venturi nozzle 13 associated with at least one of the thermally insulated cargo tanks 4 of the vessel via a pump 10 in the tank. The pump is connected to the Venturi nozzle via a vaporizer 9 and the chamber of the ejector is connected to vapour space 3 of each cargo tank. In the embodiment described the vaporizer heats the vaporized gas to a temperature suitable for feed down line 8 to the boilers.	CONCH INT METHANE LTD	GB7256870	1972/12/8
47	METHOD AND APPARATUS FOR CRYOGENIC WARM-UP	A warm-up system for liquefied gas storage containers is operable as a closed cycle and comprises a reservoir containing a liquid heat transfer medium, pumping equipment for transferring the liquid from the reservoir to a vaporiser where the liquid is vaporised at an elevated pressure, and heat exchange elements within the storage containers for indirect heat exchange with the cold of said containers. The heat transfer medium for LNG is preferably a petroleum hydrocarbon such as isopentane and the vapour fed from the vaporisor may be adjusted to balance the heating rates of the containers.	CONCH INT METHANE LTD	GB7153481	1971/11/17

48	MEANS AND A METHOD FOR REDUCING THE RISK OF EXPLOSION DURING THE CLEANING OF CONTAINERS FOR EXPLOSIVE SUBSTANCES	1392071 Preventing explosions in containers SALEN & WICANDER AB 6 June 1972 [4 Feb 1972] 26365/72 Heading ASA The risk of explosion during the cleaning of the cargo container of a ship or other container used for storing inflammable or explosive substances, the risk of explosion being due to the generation of static electricity on finely distributed liquid drops in the form of a liquid mist which are produced in the container when it is sprayed with cleaning fluid, is reduced by creating a temperature difference between the liquid mist and an additional substance in the container or cooled means disposed in the container whereby condensation nuclei having a lower temperature than the liquid mist are generated for the electrically charged liquid drops contained in the liquid mist. Carbon dioxide snow or water drops of a lower temperature than the liquid mist may be sprinkled into the container. The water drops may contain oil-dissolving chemicals or chemicals preventing the creation of selfigniting oxidation products in oil in the container. A cooling coil or other metal surface disposed in the container may be cooled to a lower temperature than the container atmosphere. The process may be carried out using apparatus having means for creating a temperature difference betwen the liquid mist and the additional substance or means adapted to be cooled in the container so that condensation nuclei having a lower temperature than the liquid mist are generated for the electrically charged liquid drops contained in the liquid mist. The aparatus may comprise means for sprinkling into the container water drops of a lower temperature than the liquid mist e.g. large water drops with low initial velocity, and may also comprise a spray-cleaning means for spraying heated sea water with or without chemicals used for the cleaning operation added thereto and a further sprinkler means for the generation of water containing condensation nuclei in the	SALEN WICANDER AB	GB7226365	1972/6/6

49	METHOD OF CONSTRUCTING A LOW TEMPERATURE LIQUEFIED GAS CARRIER	1317403 Carrying liquefied gases BRIDGESTONE LIQUEFIED GAS CO Ltd 16 June 1971 [23 June 1970] 28098/71 Headings B7A and B7S A low temperature liquefied gas carrier having a membrane tank 7 is constructed by a method which includes the steps of constructing a tank structure 6 having a frame structure 8 to support heat insulating material on the outside of the membrane tank and separately constructing a hull 1 having a hold 5 in which the tank structure is to be fitted. A rigid base member is placed under a curved portion of the bottom of the tank structure and the assembly of tank structure and base member is installed in the hold by suspending the base member, lowering the assembly into the hold and fixing the base member to the hull. In the embodiment shown the base member consists of a curved supporting plate 12 and reinforcing brackets 13. The membrane tank can be pressed inwardly by means of the base member at normal temperatures to make allowance for contraction which takes place when it is used at low temperature. (For Figure see next column)	BRIDGESTONE LIQUEFIED GAS CO LTD	GB7128098	1971/6/16
50	MARINE PROPULSION UNIT	1293703 Propelling ships by water jets COMMISSARIAT A L'ENERGIE ATOMIQUE 19 April 1971 [18 March 1970] 24575/71 Addition to 1238995 Heading B7V [Also in Division F1] The marine craft propulsion unit 10 described in the parent Specification has a feed comprising a receptacle 12 containing a substance in liquid and vapour phases, the vapour pressure being greater than the water pressure at the average operating depth of the propulsion unit and at the minimum temperature encountered by the propulsion unit. The lower portion of the receptacle, which is occupied by the liquid phase, is connected by a valve 16 and a heat exchanger 14 to the emulsifier of the propulsion unit 10. In the embodiment designed to operate at shallow depth the substance is propane or ethane or carbon dioxide gas. Liquid carbon dioxide or liquid nitrogen is used to operate at depths greater than 100 metres.	COMMISSARIAT ENERGIE ATOMIQUE	GB7124575	1971/4/19

51		1, 226, 035. Liquefied gas storage containers. CONCH OCEAN Ltd. 18 Sept., 1968 [12 Oct., 1967], No. 44324/68. Heading F4P. A non-self supporting fluid-tight cold-resistant flexible membrane tank 6 right hand side of Fig. 1, is supported against internal loads by a surrounding solid thermal insulation 5 which is itself supported by a rigid shell 2, e.g. the inner hull of a tanker and the membrane tank 6 is anchored to the insulation by rigid anglesectioned members 19, Fig. 5, which extend along and are secured to the junction of adjacent side top and bottom walls of tank 6 and referred to as corners, and members 19 are also rigidly secured to the corners of the insulation 5. The membrane tank is formed of nickel-steel corrugated sheets 16 and corrugated dihedral corner-pieces 17 and trihedral corner-pieces 171, Fig. 4, to which are welded the angled anchor members 19 along regularly spaced intervals along the lengths of the corners of the membrane tank. Members 19 are bolted to spaced hardwood blocks 21, 22, adhesively secured to insulation panels 8 constructed as described in Specification 951, 923. The spaces between adjacent hardwood blocks is occupied by balsa wood blocks 23. A modified membrane tank 41, Fig. 10, has stepped top and side walls providing internal entrant corners a and external re-entrant corners b.		GB1226035 D	1968/9/18
52	IMPROVEMENT IN TANKER FOR CARRYING LIQUEFIED GASES	1, 214, 055. Carrying liquefied gases. CONCH OCEAN Ltd. 3 Jan., 1969 [21 Feb., 1968], No. 8362/68. Headings B7A, B7M and B7S. [Also in Division F4] In a tanker for carrying liquefied gases, a fluid-tight tank 4 in hold 3 is externally insulated by thermal insulation 7 between the tank and the walls of the hold, the outer parts of the insulation adjacent the walls of the hold being formed with passages through which any water present may pass, the water being able to drain into sumps 11 near the bottom of the hold for removal through pipes 12 by pump 13. In the embodiments described the outer part of the insulation consists of timber fixing strips 6, 61 secured to the inner surface of the hold, the fixing strips being slotted as at 6a, 6b, 6c for the passage of the water.	CONCH OCEAN LTD	GB6808362	1968/2/21

53	AN IMPROVED HEAT EXCHANGER	1, 211, 766. Heating liquids in bulk. GOTAVERKEN A.B. 16 Dec., 1968 [16 Jan., 1968], No. 59655/68. Heading F4S. Liquid in a container (not shown) is forced through a heat exchanger 11 by a pump 19 driven by a steam turbine 17 and the steam from the turbine is esedu as th heating agent in the heat exchanger. The apparatus shown is intended for use in the oil storage hold of a tanker ship. The heater is submerged in the oil and the oil flow-path through the heater is indicated by arrows 15. The heater may be designed to be.lifted out of the hold when not in use. Steam enters the turbine 17 through a pipe 12 and exhaust steam from the turbine passes through a pipe 21 to the heat exchanger from which steam condensate is withdrawn at 13.	AKTIEBOLAGET GOETAVERKEN	GB6859655	1968/12/16

54	Thermal Barrier System	1, 198, 861. Utilizing energy of radiations. SANDERS NUCLEAR CORP. 27 June, 1967 [27 June, 1966], No. 29686/67. Heading G6P. [Also in Divisions F4 and H1] A diver's suit is heated by the closed circulation of a fluid to which heat is supplied by a flameless exothermic reaction. As illustrated, water is circulated through the suit and is heated in a jacket 42 surrounding a radioactive source. Water passing from the suit passes through an ion-exchange column or filter 28 and a pump 32 to a proportioning valve 36 which divides the water flow between the jacket 42 and a further jacket 54 which cools a thermoelectric generator 52. The thermoelectric generator receives heat from the radioactive source and powers the pump 32 and other electrical equipment (not shown). The valve 36 operates automatically in response to a sensor 100 to provide sufficient flow through the jacket 42 to maintain the hot junction of the thermoelectric assembly at a constant temperature. Water from the jackets flows to a plenum 62 for passage to the suit. Part of the flow is diverted through an external heat exchanger 24 by an automatic valve 60 to maintain the temperature in the plenum at a value set by a control 26. The illustrated apparatus forms a unit which is preferably attached to the front of the diver's suit, Fig. 1 (not shown), so that the diver may warm his hands on the external heat exchanger 24. A by-pass including a valve 70 prevents overpressure in the suit and permits recirculation of water when the unit is disconnected from the suit. An air purge valve 73 is included. Heat source and thermoelectric generator.- The source comprises thulium 170 and/or thulium 171 in a stainless steel capsule which is surrounded by tungsten or uranium shields 74 and 76 and by thermal insulation 102, 103. If thulium 171 is used, all or part of the shield 74 may be omitted. The water jacket 42 is formed of stainless steel and includes plates 86 and 90 whose removal allows access to the source	SANDERS NUCLEAR CORP	GB6729686	1967/6/27

55	Improvements in cooling and maintaining cool double walled liquefied gas transport tanks	1, 135, 965. Liquefied gas storage containers. J. J. McMULLEN. 14 March, 1966 [15 March, 1965; 16 March, 1965; 24 Sept., 1965], No. 4825/68. Divided out of 1, 135, 963. Heading F4P. Cooling of a liquefied gas, e.g. methane, cargo tank having spaced inner and outer walls 24, 22 and insulation 20 spaced from wall 22 is effected by circulating through the insulation and interwall spaces nitrogen gas having been cooled at 44 by heat exchange with liquid methane withdrawn from a storage tank 48, and the so-vaporized methane is passed through pipes 50, 52 to the interior of the cargo tank. The cold nitrogen gas leaving exchanger 44 is circulated through a pipe 30 in the insulation space and is returned through an aperture 32 in said pipe 30 and through a pipe 38 to the inlet of a blower 40 which discharges into exchanger 44, whilst a portion of cold nitrogen leaving aperture 32 passes through an aperture in the outer wall 22 into the interwall space and is returned through an aperture 38a to the blower inlet. The tank is also cooled by liquid methane from storage tank 48 passing through a spray pipe 60. Final cooling is effected by passing liquid nitrogen instead of liquid methane through exchanger 44. During cooling, methane vapour is withdrawn from the cargo tank through a pipe 53 and is either heated at 54 for use as fuel gas or is returned to a liquefier 58. Prior to the abovementioned cooling, the cargo tanks, insulation space and interwall space is dehydrated then purged with nitrogen gas at 0? C. withdrawn from a source 36 and passed through pipes 30, 34; the purged nitrogen being withdrawn from the interwall and insulation spaces by blower 40 which then delivers to atmosphere through a pipe 46. The cargo tank is then filled with liquid methane through line 60 and the circulating nitrogen is cooled by withdrawing by means of a pump (not shown), a small portion of liquid cargo and passing it through exchanger 44 and returning the methane	MCMULLEN JOHN J	GB6804825	1966/3/14

56		1, 095, 346. Protective suits. OCEAN SYSTEMS Inc. March 10, 1965 [March 10, 1964], No. 10074/65. Heading A3V. [Also in Division B7] A protective suit for use in environments at superatmospheric pressures e.g. a diving suit 10, Fig. 1 , is made of two layers of a flexible material 42, 44, Fig. 2c, which layers are separated from each other by foamed resilient material 40 having a plurality of interconnected spaces or voids 46 therein that are charged with a pressurized gas through a tubular member 48 to effect adequate thermal insulation of the wearer and substantially prevent compression of the material 40 at comparatively high pressures e.g. the pressure exterted by water at a depth of 400 ft. The source of the gas may be a respiratory system 22 to 28 that is connected to the member 48 by a flexible tube 50 and may contain a mixture of 97% helium and 3% oxygen. Alternatively, the gas may be helium, oxygen or carbon dioxide, that is provided by an independent source (54), Fig. 3 (not shown), which is connected by flexible tubing (60) to the material 40 in the central region of the suit to give compensation for the hydraulic gradient between the upper and lower ends of the suit. The member 48 may contain a valve; and an audible or visible alarm-indicator (not shown) may be provided to give the wearer warning when either of the layers 42, 44 is punctured, the indicator being actuated by the rate of flow of gas into the material 40 increasing. Electric heating- elements (not shown) may be embedded in the material 40. The material 40 and the materials 42, 44 may be rubber and neoprene, respectively.		GB6510074	1965/3/10

57	Improved circuit arrangements for electric power supply systems on movable craft	897, 626. Transmitting mechanical power. ASSOCIATED ELECTRICAL INDUSTRIES Ltd. Dec. 8, 1958 [Dec. 9, 1957], No. 38226/57. Class 38 (4). An electric power plant for movable craft such as ships comprises at least two alternators, one connectible to supply at least one propulsion motor and the other connectible to supply at least one auxiliary motor, the two alternators being magnetically and electrically aligned and their rotors mechanically coupled together to ensure a predetermined phase relationship between the alternator output. The two alternators may be driven from the same prime mover which may be a gas-turbine and non-reversible. Means may be provided to control the voltage supplied to the propulsion motor which may be an induction motor of the polyphase type with means for changing over two phases to reverse the motor rotation during which changeover the alternator excitation may be reduced to zero. Means may also be provided to maintain the speed of the prime mover at a desired value.	ASS ELECT IND	GB5738226	1957/12/9

58	Improvements in or relating to marine tankers for the transport of liquefied gases	892, 044. Carrying liquefied gas cargo. CORY & SON Ltd., Wm. March 31, 1958 [April 5, 1957], No. 11127/57. Class 113. [Also in Group XXVIII] A tanker for the transport in the liquid state at low temperature of methane (or like ordinarily, gaseous substance) has one or more cargo tanks each of which rests on supports which allow lateral expansion and contraction of the tank but is constrained against lateral bodily displacement by at least one connection, such as a spigot type connection, provided between the tank and the ship's structure at the tank bottom centre or the tank top centre or both. The tank 90 is stiffened internally (see Group XXVIII) and is entirely surrounded by thermal insulating material 106, 107 between the tank and the ship's structure 10. Central spigots 101, 92 at the upper and lower ends of the tank are located in seatings integral with the ship's structure. The interior of the hollow bottom spigot 92 forms a sump for the tank. This spigot is housed in a steel ring 113, Fig. 5, rigidly attached to the ship's structure by means of two concentric channel section rings 114, 115 between which are a number of flexible rubber or plastic cushions 118 filled with an hydraulic liquid, the pressure of which may be varied. These cushions hold the spigot in position while allowing for its radial expansion and contraction. The upper spigot may be similarly held, or as shown in Fig. 7 may be held by concentric rings 132, 133 having mating conical surfaces 135. The tank is supported by rollers 108 on stools 109 secured to the ship's structure. Upward movement of the tanks is prevented by anchoring chains (not shown). Specifications 892, 041, 892, 042, 892, 043, 892, 045 and 892, 046 are referred to.	WM CORY SON LTD	GB5711127	1957/4/5

59	Improvements in or relating to the heat-insulation of tanks to contain cold liquefied gases	892, 045. Carrying liquefied gas cargo. CORY & SON Ltd., Wm. March 31, 1958 [April 5, 1957], No.11128/57. Class 113. [Also in Group XXVIII] A tanker for the transport in the liquid state at low temperature of methane (or like ordinarily-gaseous substance) has one or more externally insulated cargo tanks the insulation for the circumferential wall of each of which is in the form of a resilient coherent material 107 such as glass fibre matting, which is in a state of being compressed against the tank surface when the tank is in its thermally expanded condition, so as to be able to itself expand to follow the tank movement when the tank contracts, the extent of the compression being sufficient to allow the full thermal contraction of the tank to occur without the insulation breaking contact with the tank surface. The insulation 107 is clamped against the tank by aluminium bands 152 provided with turnbuckles. Vertical aluminium strips 153 are interposed between the insulation and the circumferential bands 152 to form a lattice therewith. Top and bottom insulation 156, 106 are provided (see Group XXVIII). The tank is supported on rollers 108 mounted on stools on the ship's inner bottom 130, and has spigots 92, 101 held in rings forming part of the ship's structure by means of hydraulic cushions. Specifications 892, 041, 892, 042, 892, 043, 892, 044 and 892, 046 are referred to.	WM CORY SON LIMITED	GB5711128	1957/4/5

60	Improvements in or relating to marine tankers for the transport of liquefied gases	892, 046. Carrying liquefied gas cargo. CORY & SON Ltd., Wm. March 31, 1958 [April 5, 1957], No.11129/57. Drawings to Specification. Class 113. [Also in Group XXVIII] A marine tanker for the bulk transport in the liquid state at low temperature of methane (or like ordinarily-gaseous substance) has means for introducing into the empty cargo tank or tanks during the period between the discharge of one cargo and loading of the next a small quantity of the liquid methane from a reserve supply to keep the tank or tanks at a low temperature and maintain therein an atmosphere of methane. The liquid methane is introduced into each tank by a spray which is kept in operation for the whole period in which the tanks are empty and distributes the liquid uniformly over a substantial area of the tank internal surface. The tanker has liquefaction plant and piping connections whereby excess gaseous methane in the empty tanks is drawn off, reliquefied and returned to the reserve storage tank. Specifications 892, 041, 892, 042, 892, 043, 892, 044 and 892, 045 are referred to.	WM CORY SON LIMITED	GB5711129	1957/4/5

61	Improvements in or relating to electric drive systems	839, 008. Automatic electric transmission control. GENERAL ELECTRIC CO. Ltd. Oct. 4, 1957 [Oct. 5, 1956], No. 30482/56. Class 38 (4). In an electric driving system comprising one or more D.C. motors and one or more D.C. generators in a single closed loop, the speeds of the motors are retroactively controlled by carying their excitation in dependence upon the speed deviation from the desired value, and the current in the loop is maintained constant. The armatures of driving motors PM, SM are connected in a closed loop with the armatures of generators G1-G4 the fields of the latter being energized by an exciter E to maintain the loop current constant and the fields of the former being energized through a pilot exciter PE1 and a main exciter EM1 in accordance with the difference between a reference voltage predetermined by the setting of controllers PC and SC and the output of a tachometer generator TP. Fields EF1, EF2 which act in opposition are energized from the controllers PC, SC, and a series-connected shunt C, respectively, the output from the controllers being determined by rectifiers PX and SX to meet the requirements of the motor making the higher demand. Rectifier X2 between the exciter and reference lines permits the energizing of winding PF3 on the pilot exciter PE1 to weaken the field of motor PM whereby the loop current demanded is reduced and overload of the generators is prevented. The tachometer TP and reference voltage CV energize separate opposing fields PF2, PF1 of the pilot exciter but the two voltages may alternatively be opposed and applied to a single field. Connection of the generator field windings to the exciter E is controlled by tachometer generators TG1-TG4 coupled to the generator shafts which are driven by prime movers not shown. Wattmeters W are provided to indicate the motorload. The fields of the pilot exciters PE1, PE2 and the generator exciter E are arranged to provide full excitation in response to small differences in the strengths of	GEN ELECTRIC CO LTD	GB5630482	1956/10/5

62	Power generation	Mechanical power is obtained by distilling a crude petroleum oil to obtain a low boiling fraction having a final boiling point between 250 DEG and 430 DEG F. which is used to operate an engine capable of running on the fraction and wherein power and waste heat are produced, at least part of the waste heat being used to provide at least part of the heat necessary for the distillation. The process is especially suitable for use on board oil tankers, the crude cargo being used as the fuel precursor. The crude may be butanized, e.g. with 5-6% of added butane or used as obtained from the well. The engine used may be a diesel or oil-fired steam engine. A storage tank is provided between distillation and engine, if desired, or, with an oil-fired steam engine, the vapours may be passed direct to the burners. The combustion gases may be passed through heating coils in the distillation zone, or, if the fuel is used to operate a steam turbine, superheated steam can be used to provide the heat.	EXXON RESEARCH ENGINEERING CO	GB5729217	1957/9/17
63	Improvements in or relating to liquid storage or coní?í?ng tanks	799, 006. Heating liquids. GREEN & SON. Ltd., E. July 30. 1954 [Dec. 17, 1953], No. 35175/53. Class 64(3) [Also in Group XXVIII] A tank for storing or conveying viscous liquids comprises a tubular heating means in which steel inner tubes 1 are protected by gilled cast iron sleeves 2 shrunk or otherwise attached to the tubes 1, the ratio of the external area of the sleeves to the area of the corresponding internal surface of the tubes being not greater than 7.5 and not less than 5.5. The tubes may form a rectangular loop, be heated by steam, and be flexibly supported by bars from plates at the bottom of the tank. On vertical pipes, the gills extend axially along the pipes while on horizontal pipes the gills are preferably circular with the ratio of the radial distance from the tube axis to the centre of gravity of the curve bounding the gill to that between the tube axis and a point midway between the inner and outer surfaces of the tube being not more than 2.2 and not less than 1.8. On bends. the sleeves are made in bolted halves or sections and the clearance between them and the tube filled with lead. The flanges 9 are protected by covers 10 (see Group XXVIII).	E GREEN SON LIMITED	GB5335175	1953/12/17

64	Improvements in or relating to cold-storage insallations, notably for the preservation of fish	782, 964. Refrigerating fish. COMPAGNIE GENERALE DE GRANDE PECHE. Nov. 4, 1955 [Nov. 4, 1954], No. 31604/55. Class 29 [Also in Group XXX] In a refrigeration installation for the freezing of fish, moulds are conveyed past a loading station A and through a low temperature chamber D, while means are provided for maintaining the moulds open at the loading station, for closing the moulds before entering the freezing chamber and for opening the moulds and expelling the frozen contents on leaving the chamber. The moulds 3 are carried on crossbars between endless chains 1, driven by a motor 4, which pass over guide wheels 7. Each mould consists of two halves 8 and 9, pivoted on a rod 12 and urged together by a spring 13, with a cover 10. Of the half moulds 8 and 9, the bases have each lateral extensions 14 fitting recesses in the other base which, when the moulds are opened, serve to eject the frozen contents, and the side walls have lugs 11. The cover 10 is pivoted at 17 on to arms 18 which are pivoted at 19 to one of the half moulds, springs 20 completing the connection of the cover to the arms 18 which have bosses 18a at their rear ends. A spring latch 21 maintains the cover closed. At the loading station A the moulds pass an inclined plane 24 which bears against the bosses 18a and holds the covers 10 open. As each mould reaches the end of the plane 24 the cover bears against a 'spring biased lever 25, putting the spring under tension so that on the bosses 18a clearing the plane 24 the cover is shut. The mould then passes to a station B where the catches 21 of the covers 10 are applied by a combination of spring loaded rods 28 bearing against the arms 18 and members 26 rotating on a shaft 27 which push against the half mould 9 holding it in position. An arm 30 is pivoted to the bottom end of the rod 28 and is mounted loosely on the shaft 27 and keyed to a cam 31. Bearing on the cam is a crank 32 carrying a pivoted rod 34 which operates a switch 35. If the cover is not properly	COMPAGNIE GENERALE DE GRANDE PECHE	GB5531604	1955/11/4

65	Improvements in means for the prevention of condensation in metal structures such as ships	675, 284. Cargo ships. STEWART, I. M., HAY, Sir D. A., and BLACKWOOD, D. D., (Representatives of STEWART, Sir F. C.). March 22, 1950 [March 24, 1949], No. 8024/49. Class 113 (ii). [Also in Group XIII] A metallic ship structure is provided with an automatic control of the effective heat output of a heating means H which is applied to a wall, bulkhead W, floor or ceiling in an unrefrigerated space R adjoining a refrigerated cargo space P to maintain the bulkhead or the like above the dew point in the space R and prevent the formation of condensation. The heating means may comprise electrically heated cables or elements in a metal sheath, Fig. 2 (not shown), or a metal pipe H welded to the bulkhead W close to where it joins the deck D and through which pipe passes a fluid, such as sea water heated if necessary. Thermostats, humidistats or dew point sensitive instruments control the temperature, or flow, of the fluid or the electrical supply for the heating means. Since heating of the atmosphere of the space R is undesirable, the heating means is insulated therefrom.	IAIN MAXWELL STEWART; DAVID ALLAN HAY; DAVID DAVIDSON BLACKWOOD	GB4908024	1949/3/24

66	Improvements in electric supply systems	565, 388. Transmitting mechanical power. ENGLISH ELECTRIC CO., Ltd., CARNEGIE, H. S., and WELSH, R. J. June 7, 1943, No. 9097. [Class 38 (iv)] [Also in Group XXXVII] An electric power equipment comprises two or more independently driven alternators connected in parallel and supplying a common load through transforming means which can be adjusted, when desired, and without interrupting the load circuit, to reduce substantially to zero the E.M.F. applied to the load while the alternators are still generating and thus keep in synchronism. Fig. 1 shows a synchronous motor 3 for driving a ship's propeller and supplied by paralleled alternators 1, 2 through single phase transformers 4-6 having secondary windings 4b, 5b, 6b which can be magnetically uncoupled from the primary windings 4a, 5a, 6a when it is desired to reduce to zero the voltage across the motor. Uncoupling may be effected by providing the transformers with movable magnetic shunts. Alternatively, the transformers may be in the form of single phase induction regulators, the rotors of which are preferably ganged and which may be moved to such a position as to give zero voltage output. To render unnecessary a reversing switch for the motor, the transformers 4, 5 may be combined into a single induction regulator, whereby the secondaries 4b, 5b may be coupled with either of the primary windings 4a, 5a to obtain different phase rotations, or uncoupled from both. Auxiliary loads may be taken from the alternators through transformers 9, 10. In a modified system, the motor is connected directly to the alternators through the secondary windings of a three-phase induction regulator which, at one setting, passes the full alternator voltage-with a slight buck or boost-to the motor. At another setting, the primary windings of the regulator induce in the secondary windings a voltage equal and opposite to that of the alternators, so that the voltage across the motor is then zero.	ENGLISH ELECTRIC CO LTD; HERBERT STIRLING CARNEGIE; ROBERT JAMES WELSH	GB4309097	1943/6/7

67	Improvements in apparatus for the remote detection or location of sources of radiantenergy	470, 846. Infra-red ray detectors. WOOD, R., MOSLEY, L., and DUNKLEY, H. Dec. 21, 1935, No. 35440. [Class 40 (iii)] [Also in Group XXXVI] An infra-red ray detector comprises a pair of thermo - electric current generators of minute mass, on to one of which rays from a distant radiator are focused by means of a parabolic mirror and /or lens, while the other is completely shielded from such rays by being mounted in a shielding enclosure, the currents generated by the two thermo - electric devices being normally balanced so as to compensate for ambient and background temperature effects and means being provided for detecting thermo-electric current generated when infra-red rays are focused on the unshielded generator. The device comprises a casing 1 having a hinged front shutter 2 and rotatably mounted upon a vertical pillar 6 which is itself rotatable about a vertical axis, being supported in a pedestal bearing 9 and provided with a hand wheel 10. Pointers and scales are provided for indicating the angular position of the casing. Within the casing there is secured a parabolic reflector 13 at the focus of which is arranged a thermocouple 14, while a second thermo-couple 15, also provided in the casing, is surrounded by a shield 16 formed with openings so as to expose the thermo-couple to the ambient temperature. The thermo-couples are reversely connected in the adjacent arms of a Wheatstone bridge network, the two opposite arms of which are formed by a potentiometer with a sliding contact. The current from the thermo-couples is taken from a diagonal of the network to a low-frequency valve amplifier, the current to the amplifier being rendered intermittent either by means of a commutator or by an electromagnetically-operated make-and-break in the circuit. The thermo-couple 15 serves to compensate for changes in the ambient temperature, but when infra-red rays from an obstacle such as an aircraft, iceberg or other object fall on the thermo-	RICHARD WOOD; LEONARD MOSLEY; HARRY DUNKLEY	GB3535440	1935/12/21

68	Improvements in and relating to means for controlling the liquid masses of tanks for compensating the rolling of ships	423, 666. Stabilizing ships. GES. FUR ELEKTRISCHE APPARATE, 44, Wilhelm V Siemensstrasse, Marienfelde, Berlin. July 27, 1933, No. 21184. Addition to 380, 051. [Class 113 (i)] In an arrangement for stabilizing ships as described in the parent Specification, switches are employed to throw over the control device and the operating device suddenly when the roll angle indicator passes its zero position. The pointer 1 operated by a gyroscope or pendulum works over a ring divided into segments 4, 5, by insulating pieces 3. The segments 4, 5 are connected up to electromagnets 7, 8 which through bell-cranks 9, control the position of a shifter working in the cylinder 10. The left or right position of the shifter determined by which of the electromagnets is energized, determines the position of the main control plunger 12 which operates the two-way cock and 15 thus opens the starboard or port roll tank 37 to suction or pressure of the continually - running blower 34. When it is desired to anticipate the switching in or out of the relays 7 and 8 prior to the ship passing through its horizontal position and thus compensating for the inertia of the water masses in the tanks, the arrangement shown in Fig. 1 is supplemented by that shown in Fig. 2. In this case the ring 2 instead of being fixed is adjustable and is given a movement opposite in sense to that of the pointer 1, by means of the fork 28 which is operated by a pin 27 attached to a finger carried by a bracket 25. The position of this bracket is determined by the position of the piston 22 of a hydraulic device, throttled by the byepass 24. The movements of the piston 22 are determined by the alternative energizing of relays 18, 19, which are electrically converted to the segments 4, 5. When it is desired to compensate for a permanent list of the ship, a hydraulic control device similar to that shown in Fig. 2, is provided, but the movement of the piston in the cylinder is so damped that the piston 22 takes up a non-	GESELLSCHAFT FUR ELEKTRISCHE APPARATE M B H	GB3321184	1933/7/27