External energy storage patent

Is electricity storage innovation tackling the energy transition?
"The rapid and sustained rise in electricity storage innovation shows that inventors and businesses are tackling the challenge of the energy transition.

How fast do batteries & electricity storage technology develop?
It reveals that between 2005 and 2018,patenting activity in batteries and other electricity storage technologies grew at an average annual rate of 14% worldwide,four times faster than the average of all technology fields. Innovation in Batteries and Electricity Storage - Analysis and key findings. A report by the International Energy Agency.

Do patent applications indicate future technology trends?
As patent applications are filed many months,or even years,before products appear on the market,they are often seen as an early indicator of future technology trends. Since 2000,businesses around the globe have filed more than 65 000 IPFs in the area of electricity storage.

What is the European Patent Office (EPO)?
Headquartered in Munich with offices in Berlin, Brussels, The Hague and Vienna, the EPO was founded with the aim of strengthening co-operation on patents in Europe. Through the EPO's centralised patent granting procedure, inventors are able to obtain high-quality patent protection in up to 44 countries, covering a market of some 700 million people.

2013-03-14 Publication of US20130062890A1 publication Critical patent/US20130062890A1/en ... F24T10/40 -- Geothermal collectors operated without external energy sources, ... relatively constant with heat energy replenished on human time scales after being "mined," and further require no storage other than the earth.

When thermal energy available from the primary thermal energy source is greater than necessary to meet demands of the external load, excess energy is stored in the energy storage reservoir, and when the thermal energy available from the primary thermal energy source is insufficient to meet the demands of the external load, at least a portion of ...

Modular thermal energy storage system (1) comprising a plurality of thermal energy storage modules (10). The modules (10) are coupled to one another in series and configured for a heat transfer fluid to flow sequentially along said modules (10). Each module (10) has two operating modes, a first thermal energy transmission mode in which a transfer of thermal energy occurs ...

The invention relates to a system for storing electrical energy in the form of heat, the system comprising: - a reservoir; - a quantity of energy storage material arranged in the reservoir; - a system of tubular elements

embedded in the energy storage material and manufactured from heat and electricity-conducting material; - circulating unit for circulating a heat transport fluid ...

Methods and devices for long-duration electricity storage using low-cost thermal energy storage and high-efficiency power cycle, are disclosed. ... 2019-09-24 Priority to US16/580,421 priority Critical patent/US11181326B2/en ... FIG. 9 illustrates a modular particle heater which may be used internal or external to a storage silo, ...

An energy storage system includes modular energy storage equipment that may be connected to an external system, such as a power grid. In at least one embodiment, the energy storage system includes a power transfer control system comprising a power transfer network and a processing module or controller. The power transfer network has a first ...

Search for Geothermal Patents and Patent Applications (Class 60/641.2) Filed with the USPTO ... by a master-station dispatching system, the data of the distributed mobile energy storage systems, and obtaining external data; generating, by the master-station dispatching system, a control instruction; and controlling, by the sub-station ...

An improved method for sharing power between multiple battery energy storage systems (BESS) connected to a common DC network having a nominal voltage wherein the current from each BESS is regulated based upon a voltage-current characteristic which defines an output current which increases linearly in a predetermined ratio as the measured system voltage decreases.

The range of sources of renewable energy requires a leap forward when it comes to innovation in energy storage and other enabling technologies that will help achieve the energy transition, ...

The invention relates to systems and methods for rapidly and isothermally expanding gas in a cylinder. The cylinder is used in a staged hydraulic-pneumatic energy conversion system and includes a gas chamber (pneumatic side) and a fluid chamber (hydraulic side) and a piston or other mechanism that separates the gas chamber and fluid chamber ...

Electricity storage inventions show annual growth of 14% over past decade, joint study by European Patent Office (EPO) and International Energy Agency (IEA) finds; Amount ...

A renewable energy storage system which uses hydrogen as a storage medium. The system comprises a hydrogen generation module for producing hydrogen through electrolysis of water wherein the hydrogen generation module is powered by one or more renewable energy sources and a hydrogen storage module for storing at least part of the hydrogen as compressed ...

The energy storage system 100 illustrates a sealed container including various components and features described herein. With reference to FIG. 1B, an explode view of the energy storage system 100 of FIG. 1a is

illustrated. With reference to FIG. 1B, the energy storage system 100 includes a frame structure 102, 120.

As such, when the external electric power is applied to the flywheel energy storage system 1a, the flywheel energy storage system 1a can operate as an electric motor, and the changing electromagnetic fields are produced while the electric power passing through the windings 433 of the motor stators 430 to force the first motor rotors 410 and the ...

Justia Patents US Patent Application for Thermal Energy Storage System Patent Application (Application #20230086892) ... thus enabling the storage of thermal energy whenever external power is available (e.g., during transient periods of excess power on the utility grid, during gust of wind through a windfarm, etc.) and storing the applied power ...

2021-02-09 Priority to GB2211585.1A priority Critical patent/GB2607249B/en ... To be economically advantageous and provide high quality power receipt from or supply to an external power system, an energy storage system is advantageously providing a rapid response (i.e. short response time and the capability for modulating the output to meet ...

The disclosure relates to particle heaters for heating solid particles to store electrical energy as thermal energy. Thermal energy storage directly converts off-peak electricity into heat for thermal energy storage, which may be converted back to electricity, for example during peak-hour power generation. The particle heater is an integral part of an electro-thermal energy storage system, ...

According to GlobalData"s company profile on Stem, Power grid analytics was a key innovation area identified from patents. Stem"s grant share as of September 2023 was 72%.Grant share is based on the ratio of number of grants to total number of patents. Control system for optimizing energy storage system behind utility meter

A system for monitoring an energy storage system composed of multiple cells connected in series has a chain of monitors including at least first and second monitors. The first monitor is configured for monitoring at, least a first cell in the energy storage system to produce first monitored data. The second monitor is configured for monitoring at least a second cell in ...

The energy storage system of the present disclosure may include a battery pack in which a plurality of battery cells are connected in series and in parallel. The energy storage system may include a plurality of battery packs. First, a configuration of one battery pack 10 will be described with reference to FIGS. 1 to 2.

A compact energy storage system includes a high speed rotating flywheel and an integral motor/generator unit. The rotating components are contained within a vacuum enclosure to minimize windage losses. ... 1995-02-06 Priority to US08/384,573 priority Critical patent/US5614777A/en ... The recharging current is developed from an external charging ...

To ensure grid reliability, energy storage system (ESS) integration with the grid is essential. Due to continuous variations in electricity consumption, a peak-to-valley fluctuation between day and night, frequency and voltage regulations, variation in demand and supply and high PV penetration may cause grid instability [2] cause of that, peak shaving and load ...

In accordance with one or more exemplary embodiments, methods, devices and systems are provided for transferring charge or energy from a battery assembly of a vehicle (a ...

(19) AUSTRALIAN PATENT OFFICE (54) Title Energy storage system and method for capacity expansion thereof (51) International Patent Classification(s) ... is able to discharge towards the external power supply or the load, and accept charging from 10 the external power supply. [0003] Considering the cost, it is a usual option to first select a ...

A low-cost hybrid energy storage system receives energy from one or more external sources, and has an air compressor, low-pressure compressed air energy storage (CAES) system that receives compressed air from the compressor, and a low-temperature thermal energy storage (LTES) system that extracts heat generated by the compression of the air.

This joint study by the International Energy Agency and European Patent Office underlines the key role that battery innovation is playing in the transition to clean energy ...

An energy storage device can include a first electrode, a second electrode and a separator between the first electrode and the second electrode wherein the first electrode or the second electrode includes elemental lithium metal and carbon particles. A method for fabricating an energy storage device can include forming a first electrode and a second electrode, and ...

US20160370123A1 US14/898,780 US201414898780A US2016370123A1 US 20160370123 A1 US20160370123 A1 US 20160370123A1 US 201414898780 A US201414898780 A US 201414898780A US 2016370123 A1 US2016370123 A1 US 2016370123A1 Authority US United States Prior art keywords energy storage boiler storage system pump banks Prior art date ...

1. An underwater energy storage system comprising: wherein: a container configured to be arranged in a body of water with a water surface, the container having a container volume comprising a void container volume configured to be filled with gas and water to varying degrees at an internal pressure lower than an external pressure of the body of water ...

External energy storage patent