a configuration in which a temperature detecting unit (not shown in the figure) that detects the temperature in the casing 18 (in the evaporator E1 or in the vaporizer E2) is provided instead of the pressure detecting unit 38a. The temperature detecting unit outputs a signal corresponding to the detected temperature. In this case, the flow-rate adjusting valve 39 adjusts a valve opening according to a signal sent from the state controller 38 such that the temperature in the casing 18 (in the evaporator E1 or in the vaporizer E2) is maintained within a predetermined range.

[0024] When the heat source pump 21 provided on the intake pipe 20 is configured by the pump, the rotating speed of which is controllable, the state controller 38 may be connected to the heat source pump 21 to be capable of transmitting and receiving electric signals to and from the heat source pump 21. Consequently, it is possible to adjust a flow rate of the heat source medium according to the valve opening of the flow-rate adjusting valve 39 and the rotating speed of the heat source pump 21. In this case, the flow-rate adjusting valve 39 and the heat source pump 21 function as a heat-source-medium-flow-rate adjusting unit. The flow rate of the heat source medium may be adjusted according to only the rotating speed of the heat source pump 21. In this case, the heat source pump 21 functions as the heat-source-medium-flow-rate adjusting unit.

[0025] The cold energy recovery device 14 is a device for recovering cold energy from the vaporizer 12. The cold energy recovery device 14 includes an intermediate medium channel 40 configured to be connectable to the vaporizer 12, a refrigerant circulation circuit 42 in which a refrigerant is encapsulated, a heat exchanger 44 that causes the intermediate medium and the refrigerant to exchange heat, and adjusting means 46 for adjusting a cold energy supply amount.

[0026] The intermediate medium channel 40 is configured to be connectable to the casing 18. That is, in the casing 18 of the vaporizer 12, a first connecting section 18a and a second connecting section 18b, to which both end portions of the intermediate medium channel 40 in which the intermediate medium 4 flows are respectively connectable, are formed. The first connecting section 18a is provided in a part configuring the evaporator E1 in the casing 18. The second connecting section 18b is located above the first connecting section 18a. The second connecting section 18b is provided in a part configuring the vaporizer E2 in the casing 18. A first end portion 40a, which is one end portion of the intermediate medium channel 40, is connected to the first connecting section 18a formed in the bottom portion of the casing 18. A second end portion 40b, which is the other end portion of the intermediate medium channel 40, is connected to the second connecting section 18b formed in an upper part of the casing 18. That is, the intermediate medium channel 40 is configured to extract the intermediate medium 4 in the evaporator E1 to the outside and return the intermediate medium 4 to the vaporizer E2.

[0027] A circulation pump 48 is provided in the intermediate medium channel 40. The

casing 18 (in the vaporizer E2). Consequently, the liquefied natural gas evaporates and the intermediate medium 4 condenses. The vaporized natural gas flows into the supply pipe 32 and is further heated by the heat source medium in the heater E3. After being heated, the natural gas is supplied to the gas demand side through the supply pipe 32.

[0038] In the casing 18, the intermediate medium 4 is present in a saturated state. The intermediate medium 4 condensed in the vaporizer E2 is stored in the bottom portion in the casing 18. The liquid intermediate medium 4 accumulating in the casing 18 (in the evaporator E1) exchanges heat with the heat source medium flowing into the heat transfer tube 19 of the evaporator E1 through the intake pipe 20. At least a part of the liquid intermediate medium 4 is evaporated by the heat exchange. On the other hand, the heat source medium is cooled by the intermediate medium 4 (receives cold energy) and flows into the discharge tube 22. The heat source medium is further cooled by the natural gas in the heater E3 and discharged from the discharge tube 22. Note that the heat source pump 21 of the intake pipe 20 discharges a fixed rate of the heat source medium.

[0039] In the casing 18, control is performed such that the pressure in the casing 18 is maintained at a fixed pressure. For example, when a flow rate of the liquefied natural gas introduced into the vaporizer E2 through the introducing pipe 28 increased, the temperature and the pressure in the casing 18 drop. When detecting the pressure drop in the casing 18, the state controller 38 executes control for increasing the valve opening of the flow-rate adjusting valve 39 of the discharge tube 22. Consequently, a flow rate of the heat source medium supplied to the evaporator E1 increases. The pressure drop in the casing 18 can be suppressed. Consequently, the pressure in the casing 18 is maintained at the fixed pressure.

[0040] A part of the intermediate medium 4 accumulating in the bottom portion in the casing 18 (in the evaporator E1) flows in the intermediate medium channel 40 according to the driving of the circulation pump 48. In the heat exchanger 44, the intermediate medium 4 flowing in the intermediate medium channel 40 exchanges heat with the refrigerant in the refrigerant circulation circuit 42. The intermediate medium 4 cooled in the heat exchanger 44 returns to the inside of the casing 18 through the second connecting section 18b of the casing 18. At this moment, the intermediate medium 4 is flushed to change to a gaseous form and introduced into the casing 18 (into the vaporizer E2). Note that, in the heat exchanger 44, the intermediate medium 4 may be set to exchange heat with the refrigerant to thereby vaporize. In this case, the intermediate medium 4 in a gaseous form or a gas-liquid mixed state is introduced into the casing 18 (into the vaporizer ~~E21~~E2).

[0041] The refrigerant cooled by the intermediate medium 4 in the heat exchanger 44 cools the air in the freezer in the use-side heat exchanger 50 and thereafter returns to the heat exchanger 44.

heat source medium (an indirect LNG vaporization supplement heat amount) is reduced by the increase. In total, the recovery of the cold energy by the refrigerant and the supply of the heat source medium are performed within the range of the vaporization load.

[0046] On the other hand, when the temperature of the air in the freezer detected by the temperature sensor 62 is lower than, for example, the set temperature, the valve controller 56 reduces the valve opening of the flow-rate adjusting valve 54 of the refrigerant circulation circuit 42. Consequently, the refrigerant circulation amount decreases. At this moment, since the refrigerant temperature drops, the valve control unit 58c reduces the valve opening of the adjustment valve 58b of the intermediate medium channel 40. Consequently, since the pressure in the casing 18 drops, the state controller 38 increases the valve opening of the flow-rate adjusting valve 39 of the discharge tube 22. Consequently, it is possible to increase a cold energy amount supplied from the intermediate medium 4 to the heat source medium. Further, it is possible to suppress a rise in the pressure in the casing 18.

[0047] As explained above, in this embodiment, the vaporizer E2 vaporizes an amount of the low-temperature liquefied gas according to the demand of the low-temperature gas. At this moment, the cold energy is supplied to the intermediate medium 4 by the liquefied natural gas to liquefy the intermediate medium 4. Therefore, it is possible to supplies the cold energy from the liquefied natural gas to the intermediate medium 4 within the range of the vaporization load of the liquefied natural gas. The cold energy is supplied from the intermediate medium 4 to the refrigerant in the refrigerant circulation circuit 42 via the heat exchanger 44. The cold energy is supplied to the use-side heat exchanger 50. Therefore, it is possible to recover the cold energy received by the intermediate medium 4 from the liquefied natural gas. The amount of this cold energy supplied to the use side via the use-side heat exchanger 50 is a heat amount within the range of the vaporization load of the liquefied natural gas. Moreover, in the heat exchanger 44 that performs the heat exchange between the intermediate medium 4 and the refrigerant, the adjusting means 46 adjusts a cold energy supply amount according to a demanded cold energy load. Therefore, when the demanded cold energy load is small, it is possible to reduce a cold energy amount extracted from the refrigerant circulation circuit 42. In other words, it is possible to extract an amount of the cold energy corresponding to the cold energy load from the refrigerant circulation circuit 42 and supplies the cold energy to the use side within a range of a vaporization load of the liquefied natural gas requested from the demand side. Therefore, it is possible to use the cold energy recovery vaporizer 10 as an auxiliary cooling device. Unlike a conventional liquefied natural vaporizer used in a refrigeration warehouse or the like, since this embodiment is not based on the premise that an entire requested cold energy load is covered, it is unnecessary to provide a backup evaporator in addition to the vaporizer E2. Therefore, it is