



(12) PATENTANSØGNING

Patent- og
Varemærkestyrelsen

(51) Int.Cl⁷: F 25 B 47/02 F 25 B 7/00

(21) Patentansøgning nr: PA 2005 01574

(22) Indleveringsdag: 2005-11-11

(24) Løbedag: 2005-11-11

(41) Alm. tilgængelig: 2005-11-25

(71) Ansøger: York Denmark ApS, Christian X's Vej 201, 8270 Højbjerg, Danmark

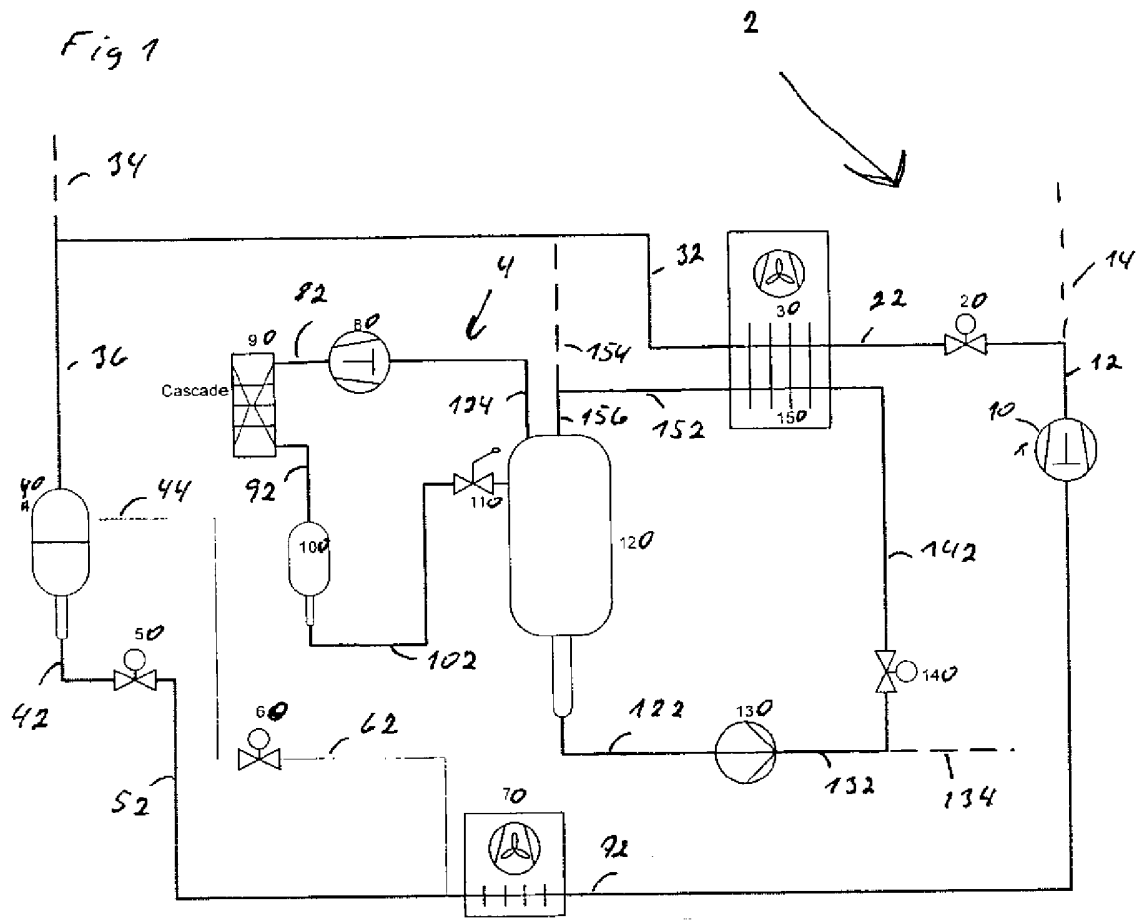
(72) Opfinder: Lennart Rolfsman, Södre Promenaden 123, SE-60231 Norrköping, Sverige
Alexander Cohr Pachai, Kløvervangen 60, 8541 Skødstrup, Danmark

(74) Fuldmægtig: Patrade A/S, Fredens Torv 3 A, 8000 Århus C, Danmark

(54) Benævnelse: Defrost system

(57) Sammendrag:

The present invention relates to a defrost system for defrosting components on which frost is formed, where the defrost system comprises at least one compressor, which compressor has a hot gas outlet, which is connected to condensing means, from where primarily liquid refrigerant is connected to pressure reduction means, from where the flushing refrigerant is led towards evaporator means. The object of the invention is to perform effective defrosting by a defrost system. This can be achieved if the defrost system is formed as an independent cooling system, where the condensing means are transmitting heat to the defrosting components, where the evaporator is cooperating with external cooling means or from the refrigeration system, enabling defrost without deflecting the main system. It can hereby be achieved that the defrost system can operate completely independent of another refrigeration system. All negative effects with traditional defrost operation of refrigeration systems are overcome by means of this solution where the defrost system operates as a system without any influence from the refrigeration system. Even the refrigeration media can be different so that the refrigeration system can be a CO₂ system where the defrost system can operate with a traditional refrigerant as 134A. In this way, it becomes possible to build the defrost circuit with other pressure conditions than the refrigeration system. In fact, this defrost system is operating as a heat pump where the condensing heat from the heat pump is used for defrosting. The defrost system can only operate if the refrigerant after passing through the condensing means is sent through at least an expansion valve and evaporator means before the refrigerant is returned to a compressor. In this way, a waste of cooling energy is performed. This cooling energy could be used in combination with another refrigeration system. Depending on where in the world a system is operating, the evaporator from the defrosting system could be used as a part of an air condition system. Also in combination with refrigeration systems, the evaporator can be used in combination with condensing or sub cooling of refrigerant.



CLAIMS

- 5 1. Defrost system (2) for defrosting components (150) on which frost is formed, where the defrost system (2) comprises at least one compressor (10), which compressor (10) has a hot gas outlet (12), which is connected to condensing means (30), from where primarily liquid refrigerant is connected to pressure reduction means (50), from where the refrigerant is led towards evaporator means (70, 210, 220), **characterized in that** the defrost system (2) is formed as a independent cooling system, where the condensing means (30) are transmitting heat to the defrosting components (150).
- 10 2. Defrost system according to claim 1, **characterized in that** the evaporator (70, 210, 220) is cooperating with external cooling means enabling defrost without deflecting the main system (4).
- 15 3. Defrost system according to claim 1 or 2, **characterized in that** the defrost system (2) are operating in conjunction with a refrigeration system (4), which refrigeration system (4) is in operation, where the condensing means (30) of the defrost system is cooperating with defrosting components (150) cooled by the refrigeration system (4) for defrosting the components (150)
- 20 4. Defrost system according to claim 1 or 2, **characterized in that** the defrost system (2) is operating in conjunction with a refrigeration system (4), which refrigeration system (4) is in standstill, where the condensing means (30) of the defrost system (2) is cooperating with defrosting components (150) cooled by the second refrigeration system (4) for defrosting the
- 25 5. Defrost system according one of the claims 1-4, **characterized in that** the defrost system (2) comprises a liquid receiver (40), which receiver (40) is connected to an expansion valve (50), where a gas connection (44) from the upper part of the receiver (50) is connected to the
- 30 receiver (40).
6. Defrost system according to one of the claims 1-5, **characterized in that** the evaporator (210, 220) of the defrost system (2) cooperates with the second refrigeration system (4) by

forming the evaporator in a second heat exchanger (210) which is heated by partly or full liquefied refrigerant of the second refrigeration system (4).

5 7. Defrost system according to one of the claims 1-6, **characterized in that** the top of the receiver (40) in the defrost system (2) is used as a liquid separator, where the top of the receiver (40) is connected through a first heat exchanger (200) for liquefying the gas, which liquid gas is led back towards the receiver (40), where the first heat exchanger (200) is part of a cascade heat exchanger, which is part of the second refrigeration system (4).

10 8. Defrost system according to one of the claims 1-7, **characterized in that** the receiver (240) comprises a heat-exchanging coil (242) in the upper part, which coil (242) is connected to the liquid outlet from the receiver (42), where the coil is reducing the temperature of the gas in the top of the receiver (240).

15 9. Method for defrosting a refrigeration system comprising at least one refrigeration system component on which frost is formed, where defrosting is performed by heating the refrigeration system component in periods of no operation of that refrigeration system component, **characterized in that** defrosting is performed by an independent defrost system, which defrost system comprises at least compressing means for compressing and heating a defrost gas,
20 which defrost gas is heating the refrigeration system components by condensing the defrost gas, which defrosting is performed in periods of no supply of refrigerant to the refrigeration system component from the refrigeration system, where the defrost system comprises a closed circuit for defrost fluid without connection to the refrigeration system.

25

Fig 1

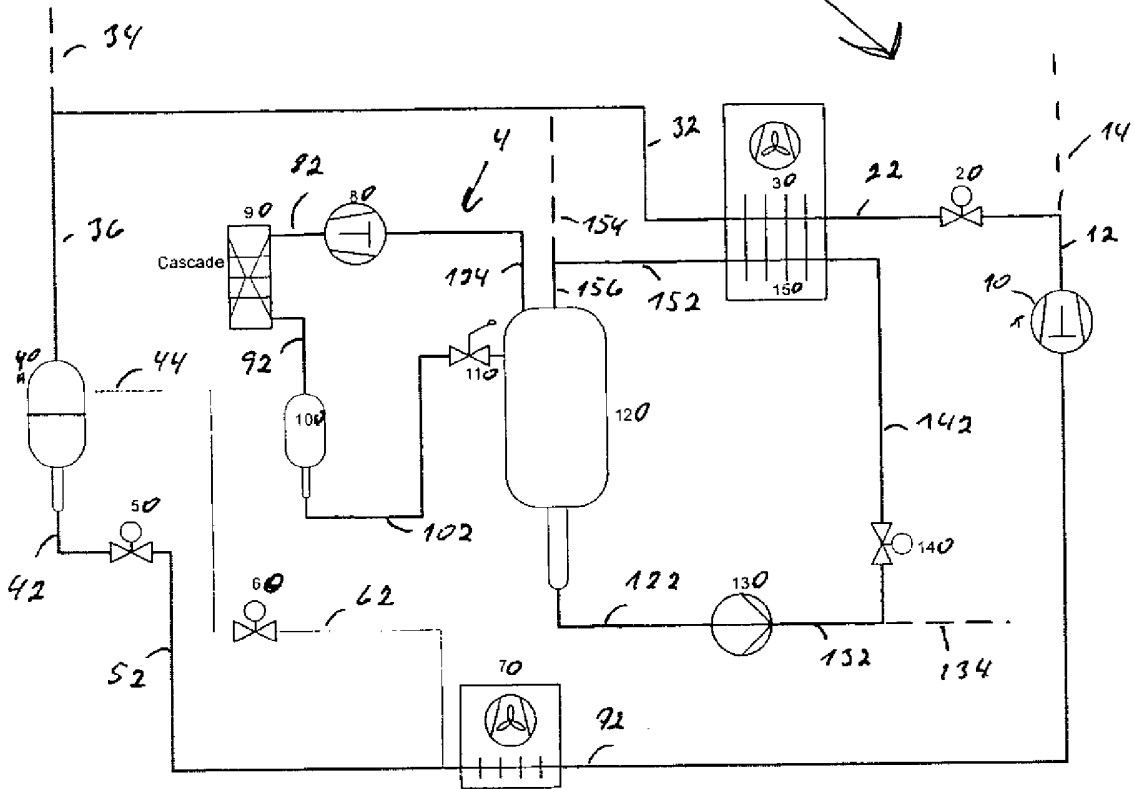
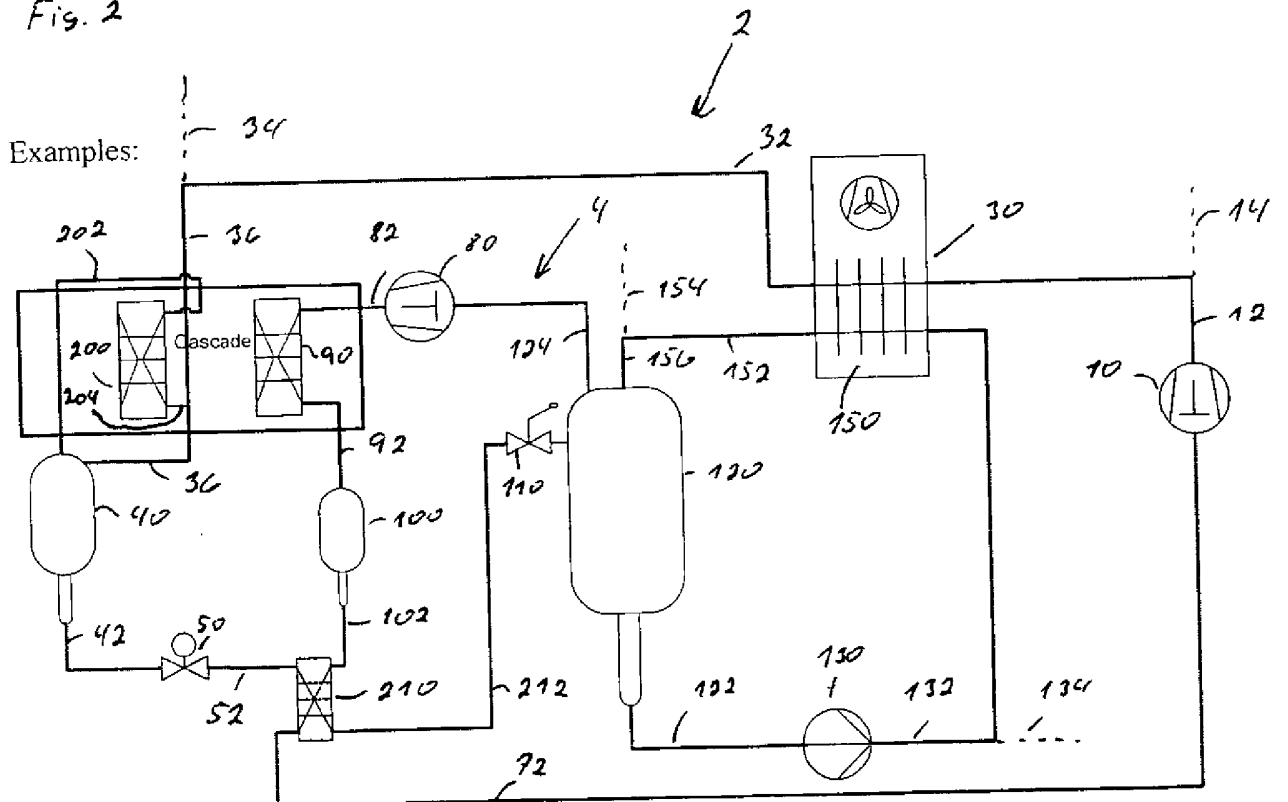


Fig. 2



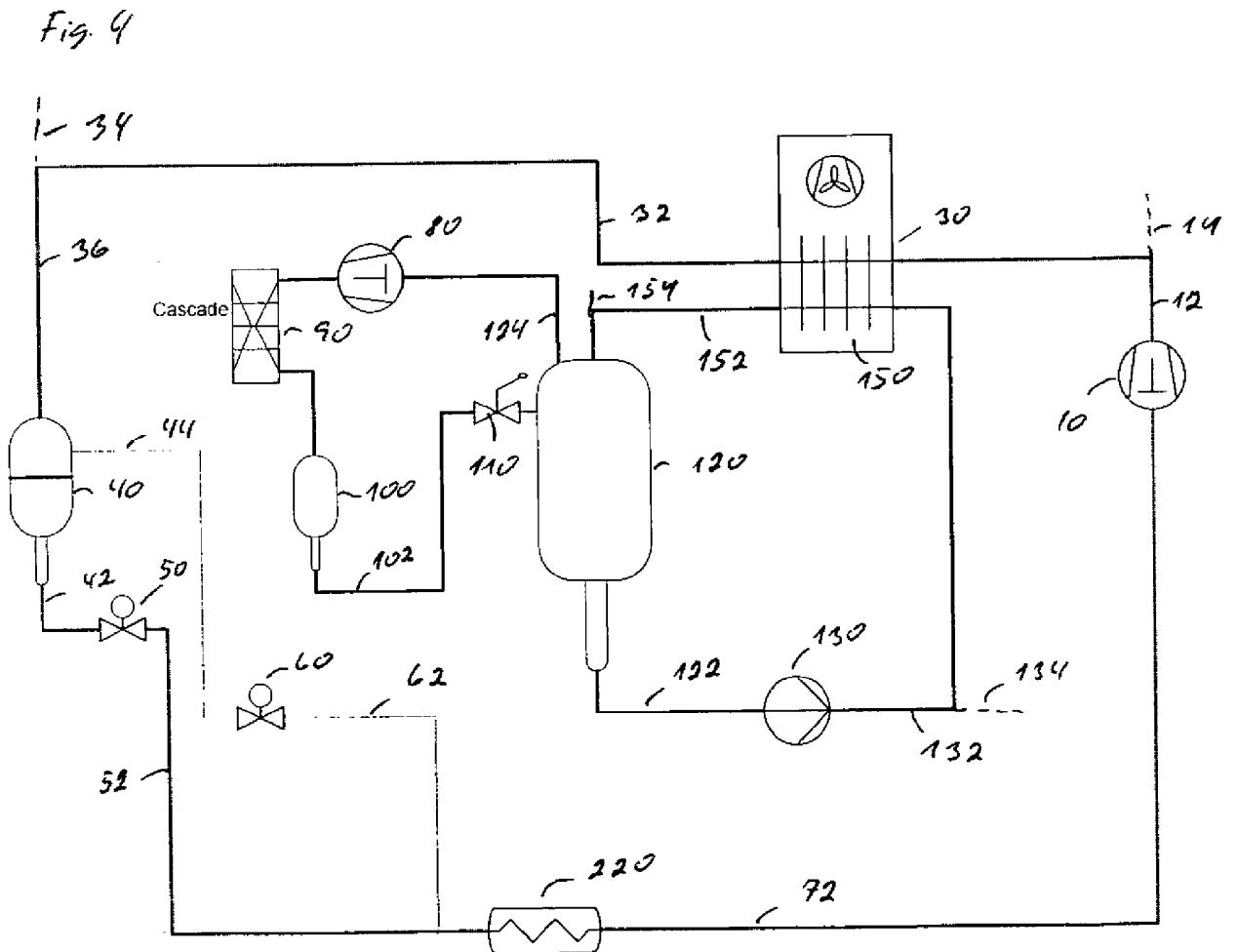
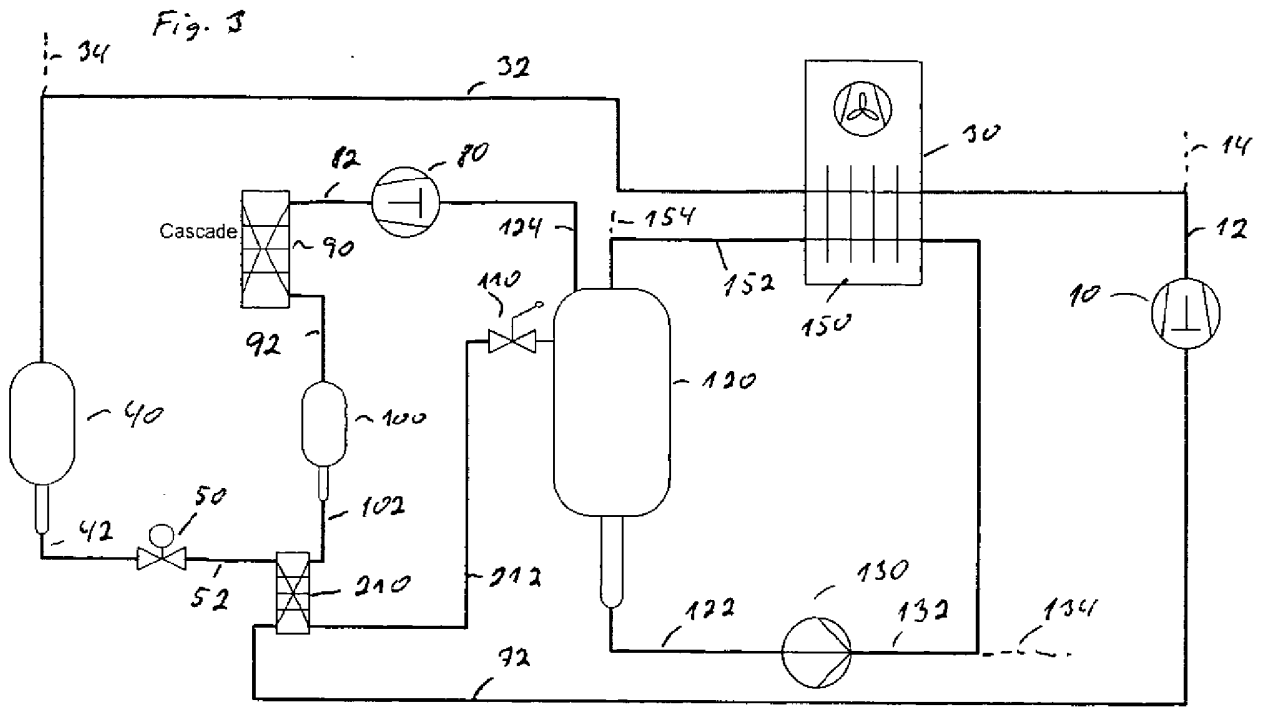
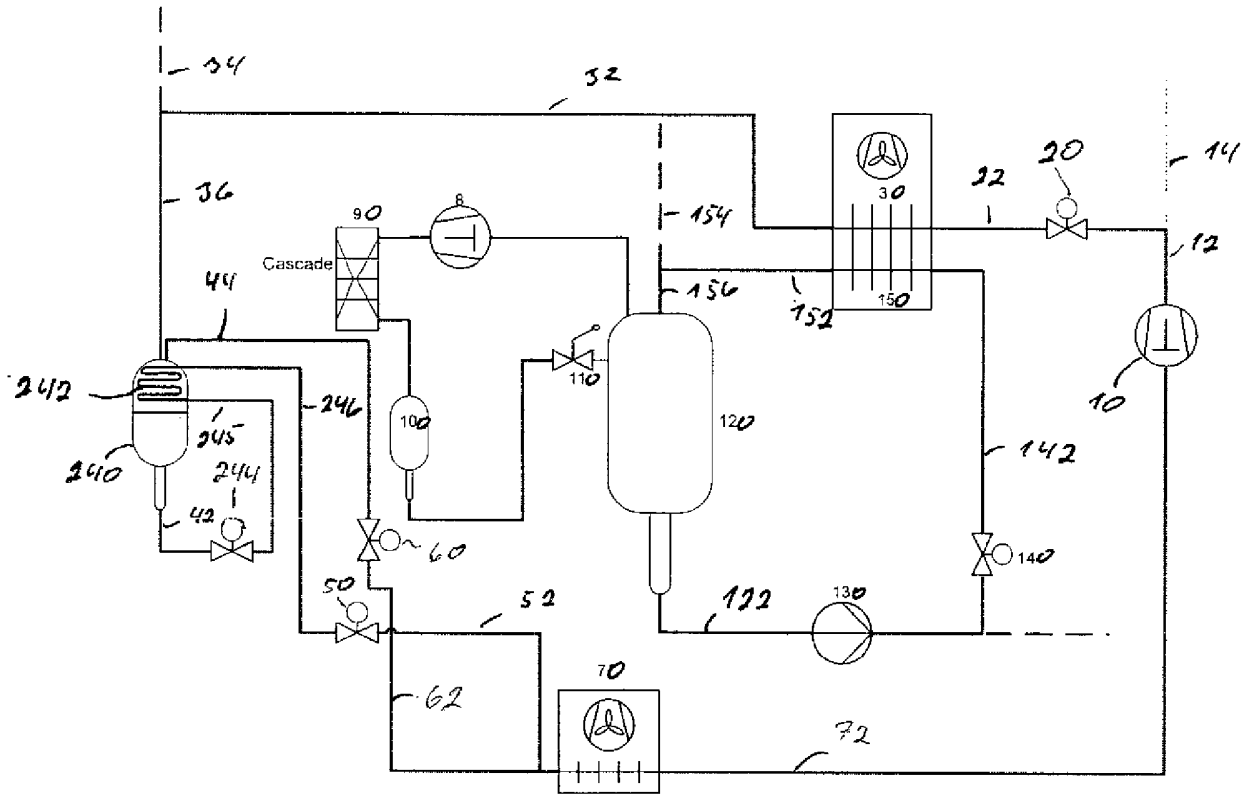


Fig. 5



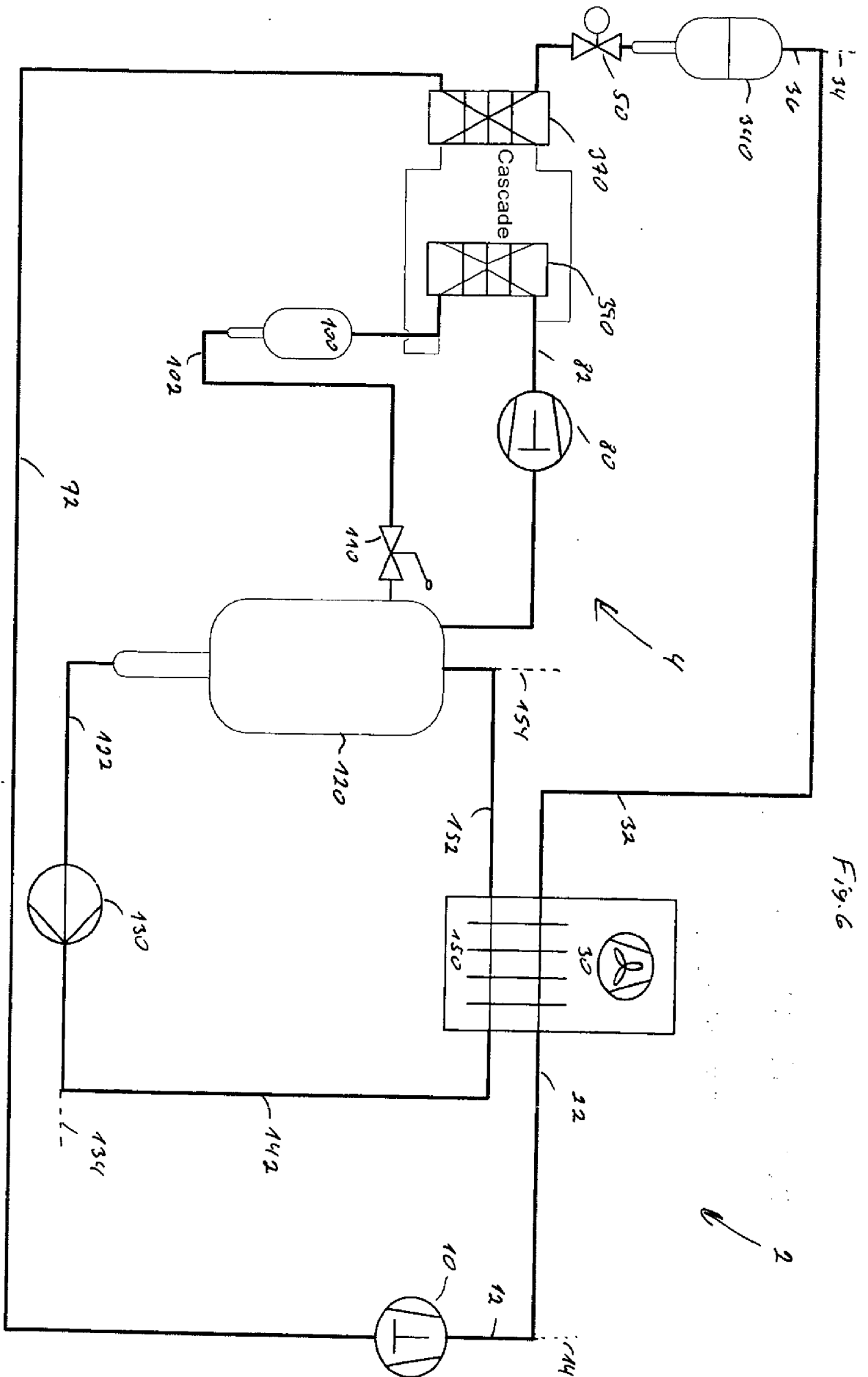


Fig. 6