Claims

1. A refrigerated system comprising:

a vapor compression system (36) defining a refrigerant flow path (38);

a heat recovery system (40) defining a heat recovery fluid flow path (42), the heat recovery system (40) being thermally coupled to the vapor compression system(36), wherein the heat recovery system (40) includes:

a first heat exchanger (70) within which heat is transferred between a heat recovery fluid and an engine coolant; at least one recovery heat exchanger (100') positioned along the heat recovery fluid flow path (42) directly upstream from the first heat exchanger (70);

a primary fluid loop (60) and a secondary fluid loop (62), the first heat exchanger (70) and the at least one recovery heat exchanger (100') being positioned along the primary fluid loop (60), wherein the secondary fluid loop (62) is thermally coupled to the vapor compression system (36);

a pump (64) located upstream from the first heat exchanger (70);

an ejector (72) having a primary inlet (74) and a secondary inlet (82); and

a heat rejection heat exchanger (84) arranged downstream from the ejector (72);

wherein heat recovery fluid from a first portion of the heat recovery fluid flow path (42) and heat recovery fluid from a second portion of the heat recovery fluid flow path (42) are thermally coupled at the at least one recovery heat exchanger (100'), wherein the first portion of the heat recovery fluid flow path (42) is arranged at an outlet (78) of the ejector (72), and the second portion of the heat recovery flow path is arranged at an outlet (68) of the pump (64).

2. The refrigerated system of claim 1, wherein heat recovery fluid is provided to the at least one recovery heat exchanger (100') from the pump (64); and optionally wherein the heat recovery system (40) and the vapor compression system (36) are thermally coupled at the at least one recovery heat exchanger (100').

3. The refrigerated system of claim 2, wherein the refrigerant of the vapor compression system (36) provided to the at least one recovery heat exchanger (100') has a temperature above an outside ambient temperature; and optionally wherein the vapor compression system (36) includes a compressor, and the refrigerant discharged from the compressor is provided to the at least one recovery heat exchanger (100').

4. The refrigerated system of any preceding claim, wherein a first portion of the heat recovery fluid output from the heat rejection heat exchanger (84) is provided to the primary fluid loop (60) and a second portion of the heat recovery fluid output from the heat rejection heat exchanger (84) is provided to the secondary fluid loop (62); and optionally wherein the second portion of the heat recovery fluid is provided to the secondary inlet (82) of the ejector (72).

5. The refrigerated system of any preceding claim, wherein the at least one recovery heat exchanger (100') includes a first recovery heat exchanger (100') and a second recovery heat exchanger (100') arranged in series with respect to the heat recovery fluid flow path (42).

6. The refrigerated system of any preceding claim, wherein the refrigerated system is part of a refrigerated compartment of a refrigerated transport system, the refrigerated compartment being arranged in thermal communication with the second heat exchanger of the vapor compression system (36).

7. A method of operating a transport refrigeration system including a refrigerated system as claimed in any preceding claim, the method comprising:

circulating a refrigerant through a vapor compression flow path of the vapor compression system (36);

circulating a heat recovery fluid through a heat recovery fluid flow path (42) of the heat recovery system (40), the heat recovery system (40) including a heat exchanger (70) for transferring heat between a heat recovery fluid within the heat recovery fluid flow path (42) and an engine coolant; and

transferring heat to the heat recovery fluid within the heat recovery fluid flow path (42) at a location upstream from the heat exchanger (70).

8. The method of claim 7, wherein transferring heat to the heat recovery fluid within the heat recovery fluid flow path (42) at a location upstream from the heat exchanger (70) includes providing the heat recovery fluid to another heat exchanger within which the heat recovery fluid is in a heat exchange relationship with a secondary fluid.

9. The method of claim 8, wherein the secondary fluid arranged in a heat exchange relationship with the heat recovery fluid has a temperature greater than an outside ambient temperature.

10. The method of claim 8 or 9, wherein the secondary fluid is the refrigerant from the vapor compression system (36), and optionally wherein the secondary fluid is refrigerant at an outlet of a compressor of the vapor compression system (36).

11. The method of claim 8 or 9, wherein the secondary fluid is the heat recovery fluid from another portion of the heat recovery fluid within the heat recovery fluid flow path (42); and optionally wherein the secondary fluid is refrigerant at an outlet of an ejector (72) of a heat recovery system (40).