We Claim:

1. A refrigerant vapor compression system comprising:

a first refrigerant heat rejection heat exchanger having a refrigerant inlet and a refrigerant outlet;

a second refrigerant heat rejection heat exchanger having a refrigerant inlet and a refrigerant outlet;

a refrigerant compression device having a first compression stage and a second compression stage;

the first and second compression stages and the first and second refrigerant heat rejection heat exchangers selectively configurable in a first arrangement wherein the first and second compression stages operate in a series refrigerant flow relationship and the second refrigerant heat rejection heat exchanger functions as an intercooler for cooling refrigerant passing from the first compression stage to the second compression stage, and in a second arrangement wherein the first and second compression stages operate in a parallel refrigerant flow relationship and the second refrigerant heat rejection heat exchanger functions as a gas cooler for cooling refrigerant passing from the first compression stage.

2. A system as recited in claim 1 wherein in the second arrangement, the first rejection heat rejection heat exchanger functions as a gas cooler for cooling refrigerant passing from the second compression stage only.

3. A system as recited in claim 1 wherein in the second arrangement, the first rejection heat rejection heat exchanger functions as a gas cooler for cooling refrigerant passing from both the first compression stage and the second compression stage.

4. A refrigerant vapor compression system comprising:

a refrigerant compression device having a first compression stage and a second compression stage;

a first refrigerant heat rejection heat exchanger having a refrigerant inlet and a refrigerant outlet;

a second refrigerant heat rejection heat exchanger having a refrigerant inlet and a refrigerant outlet;

a first refrigerant line in refrigerant flow communication with a refrigerant discharge outlet of the second compression stage, the first refrigerant heat rejection heat exchanger disposed in the first refrigerant line;

a second refrigerant line connecting a refrigerant discharge outlet of the first compression stage in refrigerant flow communication with a refrigerant inlet of the second compression stage, the second refrigerant heat rejection heat exchanger disposed in the second refrigerant line between the first compression stage and the second compression stage;

a third refrigerant line connecting the second refrigerant line in refrigerant flow communication with the first refrigerant line, the third refrigerant line tapping into the second refrigerant line at first location;

a flow control valve interdisposed in the second refrigerant line downstream with respect to refrigerant flow of the first location, said flow control valve being selectively positionable between a first open position and a second closed position; and

a check valve disposed in third refrigerant line, said check valve operative to allow refrigerant flow to pass through the third refrigerant line from the second refrigerant line to the first refrigerant line and to prevent refrigerant flow through the third refrigerant line from the first refrigerant line to the second refrigerant line.

5. A method for operating a refrigerant vapor compression system having a compression device having a first compression stage and a second compression stage comprising the steps of:

selectively arranging the first compression stage and the second compression stage in a series flow relationship with respect to refrigerant flow in a first mode of operation; and

selectively arranging the first compression stage and the second compression stage in a parallel flow relationship with respect to refrigerant flow in a second mode of operation.

6. The method as recited in claim 5 further comprising the steps of:

passing a flow of refrigerant discharging from said second compression stage through a first refrigerant heat rejection heat exchanger; and

passing a flow of refrigerant discharging from said first compression stage through a second refrigerant heat rejection heat exchanger.

7. The method as recited in claim 6 further comprising the step of:

passing the flow of refrigerant having traversed the second refrigerant heat rejection heat exchanger to an inlet of said second compression stage in the first mode of operation.

8. The method as recited in claim 6 further comprising the step of:

passing the flow of refrigerant having traversed the second refrigerant heat rejection heat exchanger through the first refrigerant heat rejection heat exchanger thereby bypassing the second compression stage in the second mode of operation.

9. The method as recited in claim 5 wherein the second mode of operation comprises operation of the refrigerant vapor compression system in a boosted capacity non-economized mode.

10. The method as recited in claim 5 wherein the first mode of operation comprises operation of the refrigerant vapor compression system in an economized mode.

11. The method as recited in claim 5 further comprising the step of operating the refrigerant vapor compression system for refrigerating air from a cargo space of a refrigerated container for transporting perishable goods.

12. The method as recited in claim 11 further comprising the steps of:

selectively arranging the first compression stage and the second compression stage in a series flow relationship with respect to refrigerant flow when the refrigerant vapor compression system is operating in an economized mode in a first stage of pulldown of a temperature within the cargo space; and

selectively arranging the first compression stage and the second compression stage in a parallel flow relationship with respect to refrigerant flow when the refrigerant vapor compression system is operating in a boosted capacity non-economized mode in a second stage of pulldown of a temperature within the cargo space.

We Claim:

1. A refrigerant vapor compression system comprising:

a first refrigerant heat rejection heat exchanger (40) having a refrigerant inlet and a refrigerant outlet;

a second refrigerant heat rejection heat exchanger (80) having a refrigerant inlet and a refrigerant outlet;

a refrigerant heat absorption heat exchanger (50) and a primary expansion device (55) operatively associated with the refrigerant heat absorption heat exchanger (50);

a refrigerant line (24) from the first refrigerant heat rejection heat exchanger (40) to the refrigerant heat absorption heat exchanger (50);

a refrigerant compression device (30) having a first compression stage (30a) and a second compression stage (30b);

the first and second compression stages (30a, 30b) and the first and second refrigerant heat rejection heat exchangers (40, 80) selectively configurable in a first arrangement wherein the first and second compression stages (30a, 30b) operate in a series refrigerant flow relationship and the second refrigerant heat rejection heat exchanger functions as an intercooler for cooling refrigerant passing from the first compression stage (30a) to the second compression stage (30b), and in a second arrangement wherein the first and second compression stages (30a, 30b) operate in a parallel refrigerant flow relationship and the second refrigerant heat rejection heat exchanger (80) functions as a gas cooler for cooling refrigerant passing from the first compression stage (30a)

characterized by further comprising

an economizer circuit including an economizer flash tank (60), an economizer circuit expansion device (65) and a refrigerant vapor line (62);

the economizer flash tank (60) being disposed in the refrigerant line (24) downstream with respect to refrigerant flow of the first refrigerant heat rejection heat exchanger (40) and upstream with respect to refrigerant flow of the refrigerant heat absorption heat exchanger (50);

the economizer expansion device (65) being disposed in refrigerant line (24) upstream with respect to refrigerant flow of the economizer flash tank (60).

the refrigerant vapor line (62) establishing a refrigerant vapor flow path between an upper region of the economizer flash tank (60) and the second compression stage (30b).

2. A system as recited in claim 1 wherein a first flow control device (64) is inter-disposed in refrigerant vapor line (62), the flow control device (64) being selectively positionable in an open position wherein refrigerant vapor flow may pass through refrigerant vapor line (62) from the economizer flash tank (60) into the inlet of the second compression stage (30b) and in a closed position wherein the flow of refrigerant vapor from the economizer flash tank (60) through the refrigerant vapor line (62) is blocked..

3. A system as recited in claim 1 wherein in the second arrangement, the first rejection heat rejection heat exchanger (40) functions as a gas cooler for cooling refrigerant passing from the second compression stage (30b) only.

4. A system as recited in claim 1 wherein in the second arrangement, the first rejection heat rejection heat exchanger (40) functions as a gas cooler for cooling refrigerant passing from both the first compression stage (30a) and the second compression stage (30b).

5. A system system as recited in claim 1, further comprising:

a first refrigerant line (22) in refrigerant flow communication with a refrigerant discharge outlet of the second compression stage (30b), the first refrigerant heat rejection heat exchanger (40) disposed in the first refrigerant line (22);

a second refrigerant line (28) connecting a refrigerant discharge outlet of the first compression stage (30a) in refrigerant flow communication with a refrigerant inlet of the second compression stage (30b), the second refrigerant heat rejection heat exchanger (80) disposed in the second refrigerant line (28) between the first compression stage (30a) and the second compression stage (30b);

a third refrigerant line (72) connecting the second refrigerant line (28) in refrigerant flow communication with the first refrigerant line (22), the third refrigerant line (72) tapping into the second refrigerant line (28) at first location;

a flow control valve (70) interdisposed in the second refrigerant line (28) downstream with respect to refrigerant flow of the first location, said flow control valve (70) being selectively positionable between a first open position and a second closed position;

a check valve (74) disposed in the third refrigerant line (72), said check valve (74) operative to allow refrigerant flow to pass through the third refrigerant line (72) from the second refrigerant line (28) to the first refrigerant line (22) and to prevent refrigerant flow through the third refrigerant line (72) from the first refrigerant line (22) to the second refrigerant line (28).

6. A method for operating a refrigerant vapor compression system having a compression device having a first compression stage (30a) and a second compression stage (30b) comprising the steps of:

selectively arranging the first compression stage (30a) and the second compression stage (30b) in a series flow relationship with respect to refrigerant flow in a first mode of operation; and

selectively arranging the first compression stage (30a) and the second compression stage (30b) in a parallel flow relationship with respect to refrigerant flow in a second mode of operation;

wherein the first mode of operation comprises operation of the refrigerant vapor compression system in an economized mode.

7. The method as recited in claim 6 further comprising the steps of:

opening a first flow control valve (64) to allow refrigerant vapor to flow from the economizer flash tank (60) through the refrigerant vapor line (62) and refrigerant line (28) to the inlet of the second compression stage (30b);

opening a third flow control valve (70) to allow refrigerant flow through refrigerant line (28) from the discharge outlet of the first compression device (30a), through the second refrigerant heat rejection heat exchanger (80) to the inlet to the second compression stage (30b); and

closing a second flow control valve (66);

thereby operating the second refrigerant heat rejection heat exchanger (80) as an intercooler, and increasing the capacity of the compression device through the increased mass flow from the refrigerant vapor supplied from the economizer flash tank (60).

8. The method as recited in claim 6 further comprising the steps of:

passing a flow of refrigerant discharging from said second compression stage through a first refrigerant heat rejection heat exchanger; and

passing a flow of refrigerant discharging from said first compression stage through a second refrigerant heat rejection heat exchanger.

9. The method as recited in claim 8 further comprising the step of: passing the flow of refrigerant having traversed the second refrigerant heat rejection heat exchanger to an inlet of said second compression stage in the first mode of operation.

10. The method as recited in claim 8 further comprising the step of: passing the flow of refrigerant having traversed the second refrigerant heat rejection heat exchanger through the first refrigerant heat rejection heat exchanger thereby bypassing the second compression stage in the second mode of operation.

11. The method as recited in claim 6 wherein the second mode of operation comprises operation of the refrigerant vapor compression system in a boosted capacity non-economized mode.

12. The method as recited in claim 6 further comprising the step of operating the refrigerant vapor compression system for refrigerating air from a cargo space of a refrigerated container for transporting perishable goods.

13. The method as recited in claim 12 further comprising the steps of:

selectively arranging the first compression stage and the second compression stage in a series flow relationship with respect to refrigerant flow when the refrigerant vapor compression system is operating in an economized mode in a first stage of pulldown of a temperature within the cargo space; and

selectively arranging the first compression stage and the second compression stage in a parallel flow relationship with respect to refrigerant flow when the refrigerant vapor compression system is operating in a boosted capacity non- economized mode in a second stage of pulldown of a temperature within the cargo space.