Aug. 14, 1956 A. A. KERNJACK 2,758,453

CONDENSER AND FAN ARRANGEMENT IN REFRIGERATION APPARATUS

Filed July 9, 1953 2 Sheets-Sheet 1

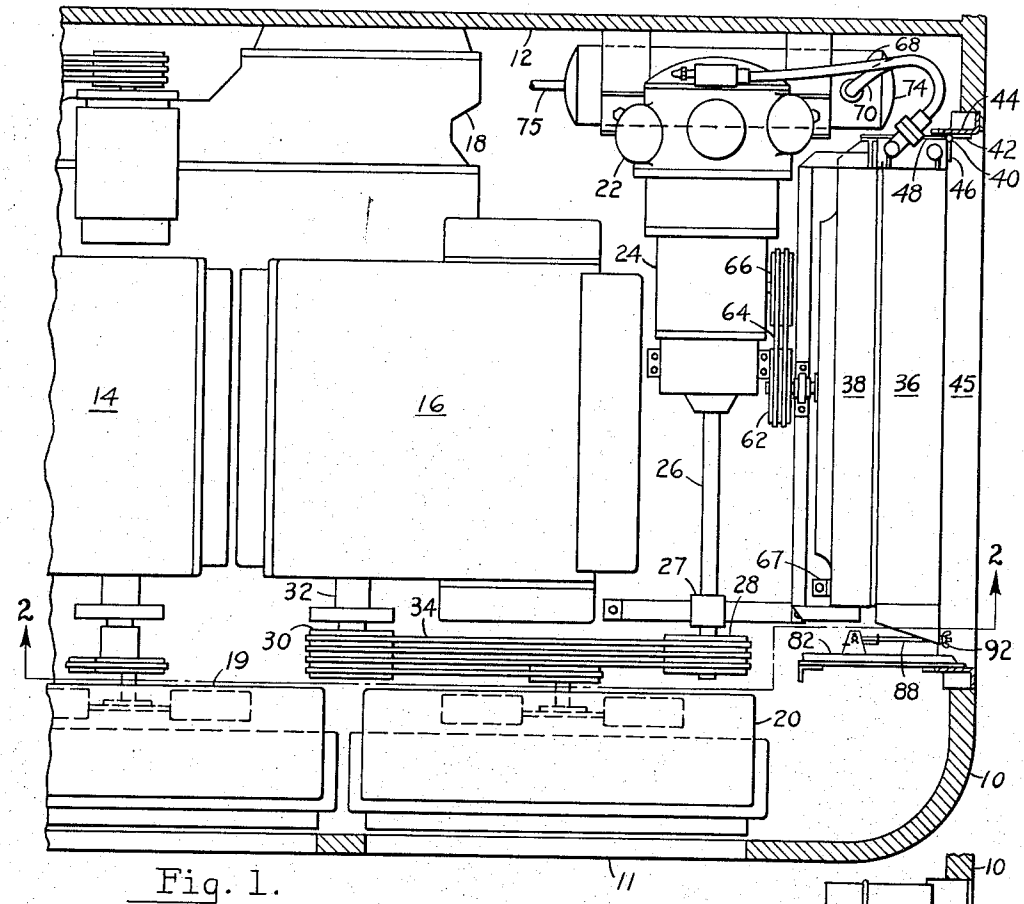


Fig. 1.

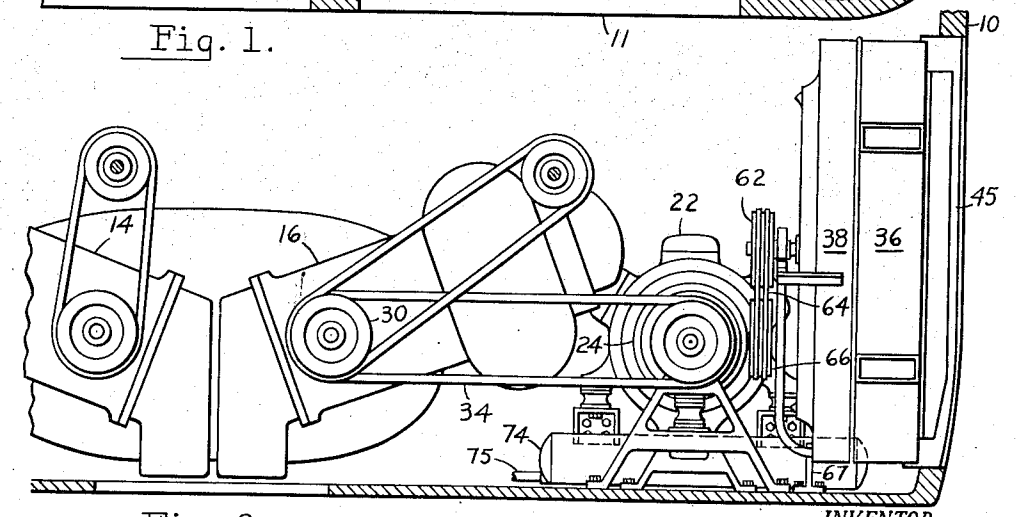


Fig. 2.

INVENTOR.
ANTHONY A. KERNJACK
BY
Holmes & Anderson
ATTORNEYS

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Fig. 3.

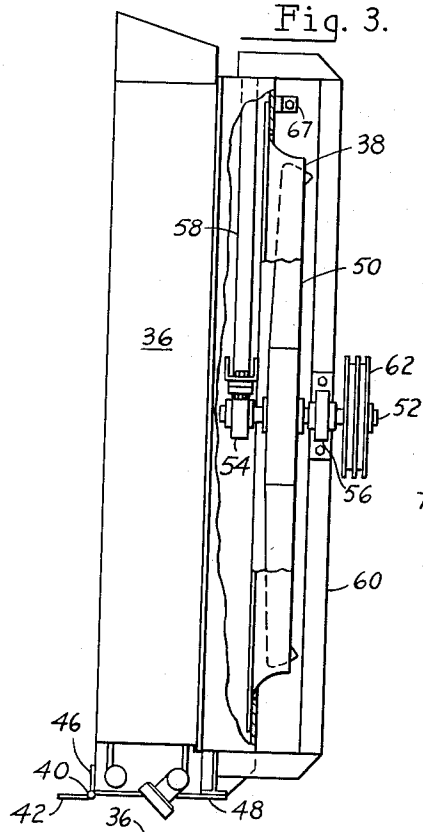
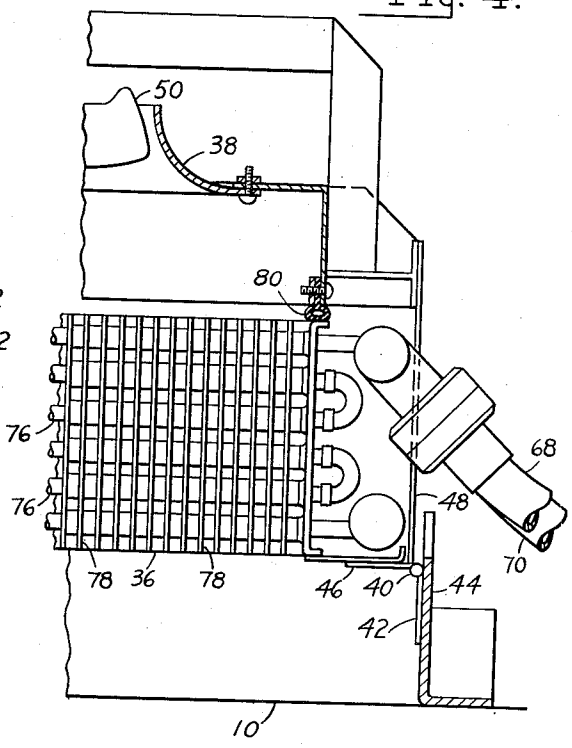


Fig. 4.



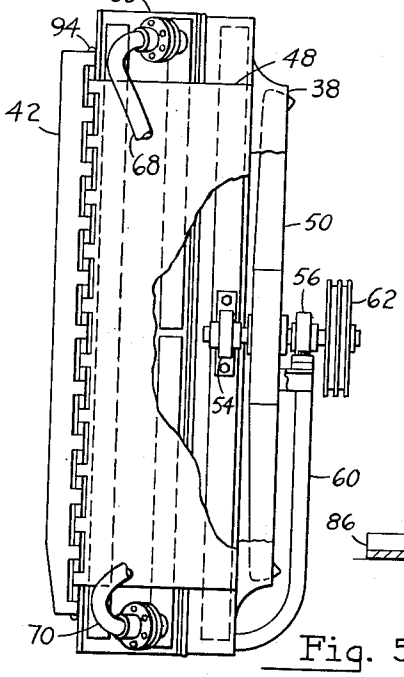


Fig. 5

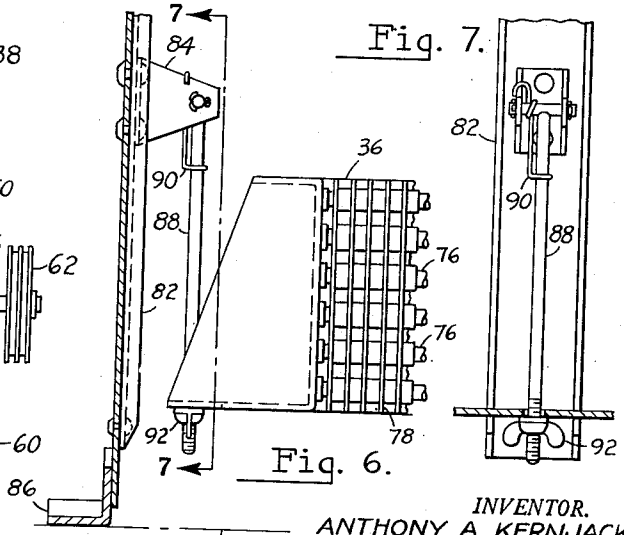


Fig. 6.

Fig. 7.

INVENTOR.
ANTHONY A. KERNJACK
BY
Holmes & Anderson
ATTORNEYS

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CONDENSER AND FAN ARRANGEMENT IN REFRIGERATION APPARATUS

Anthony A. Kernjack, Detroit, Mich., assignor to The Trane Company, La Crosse, Wisconsin

Application July 9, 1953, Serial No. 366,939

3 Claims. (Cl. 62—117)

The present invention relates to a refrigeration machine and more particularly to a refrigeration machine which is designed for use in a vehicle body.

One object of the invention is to provide a refrigeration machine which is compactly arranged for ease of installation, inspection and repair and in which the condenser and the fan may be pivoted out of the vehicle body for inspection or repair or to provide access to other equipment such as the compressor or compressor drive.

It is another object of this invention to provide a hinge for mounting the condenser for pivotal movement and to provide flexible refrigerant conduits to the condenser so that the condenser may be pivoted without opening the refrigerant system to the atmosphere.

It is still another object of the invention to provide a single hinge for pivotally supporting the condenser and the fan assembly and for permitting pivotal movement of the condenser alone if desired.

It is still another object of the invention to provide a latch for holding the condenser and fan assembly in operative position.

Other objects of the invention and the various advantages and characteristics of the present apparatus will be apparent from a consideration of the following detailed description.

In the drawings which accompanying and form a part of this specification and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a plan view of the apparatus arranged in the equipment compartment of the vehicle.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a top plan view of the condenser and fan assembly with part of the fan housing broken away.

Figure 4 is a plan view of part of the condenser and fan assembly showing the hinge construction.

Figure 5 is a view in vertical elevation of the fan and condenser assembly with part of the fan housing broken away.

Figure 6 is an enlarged top plan view of the latch construction for the fan and condenser assembly.

Figure 7 is a sectional view taken on line 7—7 of Figure 6.

Referring now to Figure 1, numeral 10 denotes the exterior side wall of the vehicle and numeral 11 denotes the exterior rear wall of the vehicle. A partition 12 separates the equipment space from the rest of the vehicle space. Engines 14 and 16 are mounted in the equipment space and drive the bus through a transmission 18. Engines 14 and 16 have radiator cooling assemblies 19 and 20 respectively. A refrigeration compressor 22 is mounted to be driven by the engine 16 as will be described in detail. A transmission 24 is connected to and drives the refrigeration compressor 22. The transmission 24 has an extended shaft 26 supported for rotation at its outer end in bracket 27. On the end of shaft 26 is mounted a pulley 28. A driving pulley 30 is mounted on the crankshaft 32 of the engine 16, and belts 34 transmit the driving force from the pulley 30 to the pulley 28 and thus to the shaft 26 of transmission 24.

A condenser 36 and a condenser fan housing 38 are mounted on a hinge 40 which has one leaf 42 welded or bolted to a bracket 44. Bracket 44 is welded or otherwise secured to the exterior wall 10 of the vehicle adjacent an opening 45 in the side wall 10. Hinge 40 has a leaf 46 which is secured to condenser 36 by welds or screws. Hinge 40 has another leaf 48 which is secured to the fan housing 38 by welds or screws. A fan wheel 50 is mounted on shaft 52 which is rotatably supported in bearings 54 and 56. Bearing 54 is supported by bracket 58 and bearing 56 is supported by bracket 60. Mounted on shaft 52 is a pulley 62 which is driven by V-belts 64 from pulley 66 which is mounted on and driven by the transmission 24. A stop 67 is secured to the floor of the vehicle and engages fan housing 38 thus determining its operative position. A flexible conduit 68 is connected to the compressor 22 and to the condenser 36 to conduct compressed refrigerant from the compressor 22 to the condenser 36. Another flexible conduit 70 is connected to the condenser 36 and to the receiver 74 to conduct liquid refrigerant from condenser 36 to receiver 74. Liquid refrigerant flows from receiver 74 through conduit 75 to the low side of the refrigeration system of the vehicle. This part of the system has not been shown because it can be of conventional design in which a fan blows air from the vehicle space, or outside air, or a combination of the two through an evaporator coil. Refrigerant gas returns from the low side of the system to the compressor 22. The condenser 36 has a plurality of tubes 76 for conducting the refrigerant in a circuitous path from the conduit 68 to the conduit 70. Fins 78 are mounted on tubes 76 for good heat transfer. However the fins 78 may be omitted if desired.

The fan housing 38 has secured thereto a sealing gasket 80 of rubber or other suitable flexible material. Sealing gasket 80 engages and is deformed by the condenser 36 and thereby seals the connection between condenser 36 and fan housing 38 to prevent the leakage of air through said connection. The fan housing 38 and the condenser 36 are held in operative position by a latch designated generally by numeral 82 and shown in detail in Figures 6 and 7. Latch 82 has a bracket 84 which is welded or screwed to an angle 86 which in turn is welded or screwed to the side 10 of the vehicle. A T-shaped member 88 is rotatably supported in bracket 84. A spring 90 acts between bracket 84 and T-shaped member 88 to urge T-shaped member to pivot away from the condenser 36. A wing nut 92 threadedly engages the end of T-shaped member 88.

When it is desired to pivot the condenser or the condenser and fan assembly outwardly for inspection or repair, the wing nut 92 is retracted and the spring 90 pivots the T-shaped member 88 away from the condenser 36. The condenser 36 may then be swung out through the opening in the wall 10 of the vehicle.

If it is also desired to swing the fan assembly out for inspection or repair, it is only necessary to reach through the fan housing and remove belts 64 from the pulleys 62 and 66. The fan housing 38 may then also be swung out through the opening in the wall 10 of the vehicle for inspection and repair. When both the condenser 36 and fan housing 38 are in outward position an access opening is provided to the compressor and other equipment in the equipment space. In operation the fan housing 38 is held in position against the stop 76 by the force of the condenser 36 against the sealing gasket 80. The condenser 36 in turn is held in position by the latch 82. The condenser 36 and fan housing 38 have been hinged at their forward sides relative to the travel of the vehicle

in order that the force of the air traveling over them will tend to force them back into operative position in the event that the latch **82** fails or is not properly secured.

When it is desired to remove the condenser and the fan assembly for shop repair, it is only necessary to remove the hinge pin **94** from the hinge **40** and to remove the belts **64** as previously described.

Whereas the apparatus has been described as being primarily adapted for use in connection with a vehicle, it is to be understood that it may be used in other capacities or with other types of refrigerating apparatus. It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention. Having thus described the invention, what I claim as new and desire to secure by letters patent is:

1. Refrigeration apparatus comprising an enclosure having an opening, a refrigerant compressor in said enclosure, a refrigerant condenser in said enclosure, a flexible conduit for conducting refrigerant from said compressor to said condenser, a fan for moving air through said condenser, means pivotally supporting said condenser in operative position across the opening in said enclosure and means pivotally supporting said fan in operative position to move air through said condenser, said condenser and said fan being constructed and arranged to be moved angularly from their operative positions through the opening in the enclosure to positions in which they extend outwardly from said enclosure.

2. In refrigeration apparatus for an enclosure, a refrigerant compressor, a condenser, a receiver, flexible conduits for conducting refrigerant from said compressor to said condenser and from said condenser to said receiver, a fan for moving air through said condenser,

hinge means adapted to be secured to an enclosure and pivotally supporting said condenser for movement about a substantially vertical axis from a position in said enclosure to a position outside of said enclosure and hinge means adapted to be secured to the enclosure for pivotally supporting said fan for movement about substantially the same vertical axis from a position in said enclosure to a position outside of said enclosure.

3. Refrigeration apparatus comprising an enclosure having an opening, a refrigerant compressor in said enclosure, a refrigerant condenser in said enclosure, a flexible conduit for conducting refrigerant from said compressor to said condenser, a fan housing in said enclosure, a fan in said housing for moving air through said condenser, means pivotally supporting said condenser in operative position across the opening in said enclosure, means pivotally supporting said fan housing in operative position to blow air through said condenser, a stop engaging said fan housing to limit its pivotal movement inwardly from the opening of said enclosure, a flexible sealing gasket between said fan housing and said condenser, means for forcing said condenser against said fan housing to compress said sealing gasket and to force said fan housing against said stop.

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