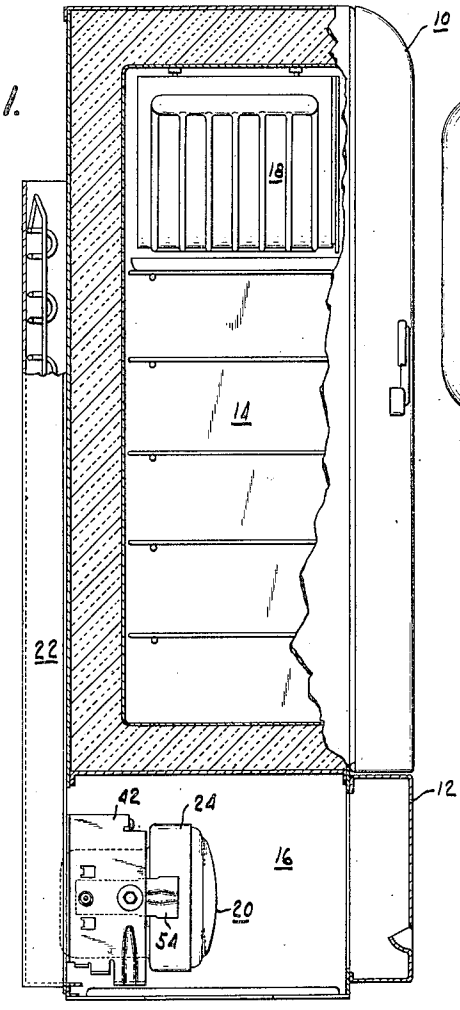
May 1, 1951 A. E. TRUELOVE ET AL 2,551,514

MOUNTING ARRANGEMENT OF REFRIGERATION UNIT

Filed Jan. 6, 1948 2 Sheets-Sheet 1

FIG. 1.



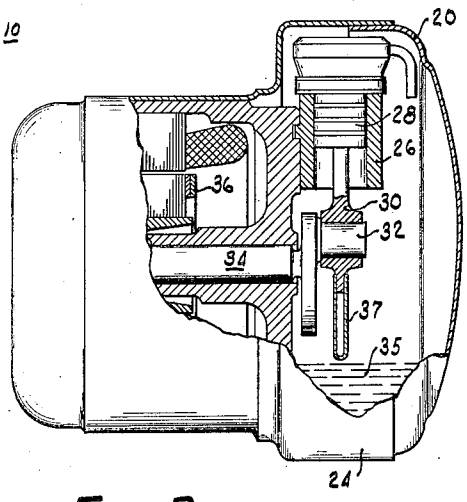


FIG. 2.

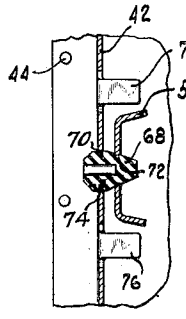


FIG. 6.

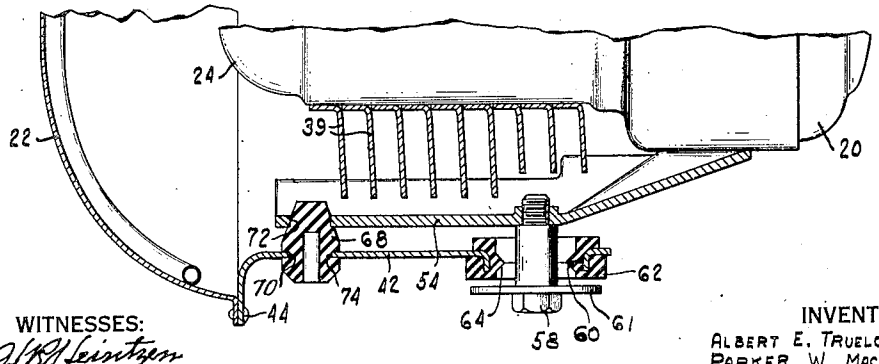


FIG. 5.

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MOUNTING ARRANGEMENT OF REFRIGERATION UNIT

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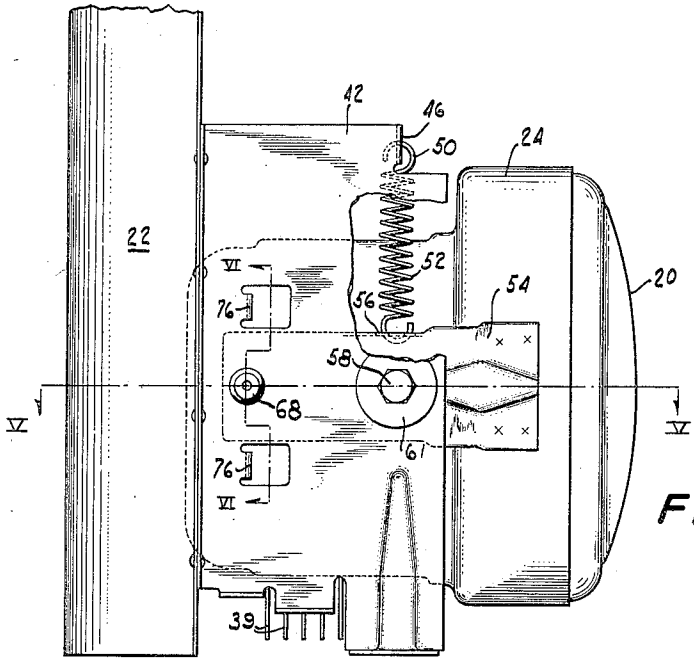


FIG. 3.

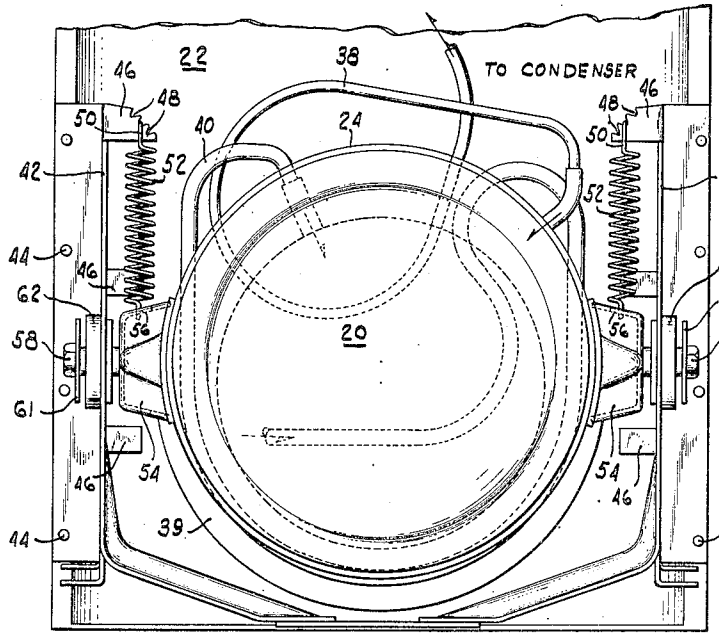


FIG. 4.

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Patented May 1, 1951

2,551,514

UNITED STATES PATENT OFFICE

2,551,514

MOUNTING ARRANGEMENT OF REFRIGERATION UNIT

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Application January 6, 1948, Serial No. 742

11 Claims. (Cl. 62—116)

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This invention relates to refrigeration apparatus and more especially to a mounting of the refrigerant compressing unit in a refrigerator cabinet.

It is an object of the invention to provide a mounting for a refrigerant compressing unit in a refrigerator cabinet which mounting affords substantially free oscillations of the unit even when the cabinet is slightly tilted.

It is another object of the invention to provide a mounting of the type described, which mounting cushions the jars incident to the shipping of the refrigerator so that blocking devices during shipment are unnecessary.

These and other objects are effected by our invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is an elevation of a refrigerator with parts broken away to show the refrigerant compressing unit and the mounting therefor.

Fig. 2 is an elevation of the refrigerant compressing unit of the refrigerator with parts broken away.

Fig. 3 is a side elevation of portions of the refrigerating apparatus and shows a portion of the mounting of the refrigerant compressing unit.

Fig. 4 is a front elevation of portions of the refrigerating apparatus shown in Fig. 3.

Fig. 5 is a detailed sectional view of the mounting of the refrigerant compressing unit taken on the line V—V of Fig. 3.

Fig. 6 is a detailed sectional view taken on the line VI—VI of Fig. 3.

In the drawings, the reference numeral 10 designates a refrigerator comprising a cabinet 12 having an insulated food storage chamber 14 in the upper portion thereof and a machine compartment 16 below the insulated chamber 14. An evaporator 18 is located in the upper portion of the insulated chamber 14, and a refrigerant compressing unit 20 is located in the machine compartment 16. A plate type condenser 22 is secured to the rear of the cabinet 12.

The refrigerant compressing unit 20 comprises a sealed casing 24 enclosing a vertical compressor cylinder 26 and a compressor piston 28 therein. The piston 28 is actuated through a connecting rod 30 by a crank pin 32 on a horizontal crank shaft 34 driven by an electric motor 36. The lower portion of the casing 24 forms an oil sump 35 containing a quantity of lubricating oil. An oil scoop 37 is attached to the connecting rod 30 to splash oil over the moving parts. The refrigerant compressing unit 20 is connected by tubing 38 with the condenser 22 and by tubing 40 with the evaporator 18. Cooling fins 39 are secured to the casing 24.

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The mounting of the refrigerant compressing unit 20 in the cabinet 12 comprises two sheet metal brackets 42 secured by rivets 44 to the vertical edges of the plate condenser 22. These brackets 42 extend into the machine compartment 16 and a tab 46 is turned inwardly on each of the brackets 42 and is provided with a series of notches 48 at varying elevations. Each tab, at one of its notches, engages a hook 50 formed on the upper end of a vertically coiled metal spring 52. The lower ends of the springs 52 are also formed into hooks and each hook engages one of two brackets 54 each of which is secured to one of the side walls of the sealed casing 24. The brackets 54 are formed of sheet metal and two holes 56 are punched in each of them to accommodate the hooks on the lower ends of the springs 52. The springs 52 support substantially the entire weight of the motor compressing unit 20 and are secured to the unit 20 in such a manner that a line passing through their points of attachment to the brackets 54 passes slightly above the center of gravity of the unit 20. The unit thus hangs in a stable position on the springs 52.

A pin 58 is secured to each bracket 54 at a point below the lower end of the springs 54 by means of screw threads. The pins 58 extend through holes 60 formed in the brackets 42. The edge portions of the brackets 42 near the holes 60 are bent outwardly and a rubber grommet 62 is secured in each of the holes 60. Each pin 58 is provided with a broad washer-like head 61 which overlies the rubber grommet 62. A projection 64 is formed on the inner surface of each rubber grommet 62 opposite the turned-over marginal portion of the bracket 54. The projection 64 and also the grommet 62 as a whole form a resilient bumper which limits the travel of the unit 20 in all directions. The pins 58 are so located that a straight line passing through them passes through the center of gravity of the unit 20.

A stabilizing support is also secured to each of the brackets 42. This stabilizing support comprises two resilient rubber plugs 68 each having a peripheral groove 70 adjacent one end thereof. A plug 68 is inserted in a hole 74 in each of the brackets 42 so that the marginal edges of the bracket 42 adjacent the hole 74 lie in the groove 70. The portion of each plug 68 which projects inwardly from the bracket 42 snugly engages a second hole 72 in the bracket 42. The portion of each of the plugs 68 secured to the brackets 42 is provided with an axial bore to increase its resiliency and to facilitate its insertion in the holes 74. Tabs 76 are punched out from the metal forming the bracket 42 above and below each of the holes 74 to limit the vertical travel of the portion of the bracket 54 which engages the plug 68.

It will be noted that the springs 52 support substantially the entire weight of the unit 20. The plugs 68 are thus not stressed so that their resilience is not reduced.

It will be noted further that the axes of the springs 52 and of the pins 58 lie in a vertical plane while the axes of the rubber plugs 68 and of the pins 58 lie in a horizontal plane which intersects the aforementioned vertical plane on a line which passes through the axis of the pins 58. The rubber plugs 68 thus tend to center the pins 58 in the grommet 62 in the horizontal plane and the springs 52 tend to center the pins 58 in the grommet 62 in the vertical plane. The rubber plugs 68 are furthermore widely spaced apart so that in effect they form a resilient hinge joint which opposes shifting of the pins 58 in their axial direction. This centering of each of the pins 58 in the respective grommets 62 is of importance because it obviates the need of carefully leveling the cabinet 10 when in use. The cabinet 10, for example, may be tilted slightly in any direction without having the pins 58 or the bracket 54 touch the grommet 62 when the unit 20 is operating.

The diametrical and wide spacing of the rubber plugs 68 on opposed sides of the motor shaft 34 also assist the springs 52 in opposing the rotation of the casing 24 approximately on the axis of the shaft 34 of the motor 36. This tendency of the casing 24 to rotate is caused by the acceleration of the motor rotor when the motor 36 is started.

Since the tendency of the pin 58 and of the bracket 54 to contact the bushing 62 is largely reduced by this mounting, the clearance between the bushing 62 and the pin 58 and bracket 54 is quite small. Such a small clearance is of advantage when the refrigerator is being shipped since no hold-down bolts or blocking are required for the motor compressing unit 20. The small clearance reduces the magnitude of the oscillations and bouncing of the unit 20 in its supports during shipment so that the unit 20 cannot hammer the grommet 62 to pieces. The tabs 76, of course, protect the rubber plugs 68 from severe rotating movements of the unit which would force the plugs 68 out of their holes 74.

It will be apparent from the above that this invention provides a mounting for a refrigerant compressing unit in a refrigerator cabinet which mounting does not transmit the vibrations of the unit to the cabinet, which mounting is not critical of slight tilting of the refrigerator cabinet in any direction while the refrigerator is in operation, and which mounting permits the shipping of the refrigerator without locking devices for the unit.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What we claim is:

1. In a refrigerator having a compartment, a unit in said compartment, said unit comprising a refrigerant compressor, a motor for driving said compressor, a casing enclosing said motor and compressor, a first rigid supporting element secured to one side of said casing, and a second rigid supporting element secured to the opposite side of said casing, a resilient mounting for said unit, said mounting comprising first and second holding elements secured in said compartment, a first metal spring having a first end engaging said first holding element and a second end engaging said first supporting element, a second metal spring having a first end engaging said second holding element and a second end engaging said second supporting element, said first and second springs carrying substantially the entire weight of said unit, resilient holding means for resiliently resisting all horizontal movements of said unit in said compartment, resilient bumping means in said compartment near but spaced from portions of said unit to allow a limited travel of said unit in all directions within said spacing and to resiliently resist travel of said unit in said directions beyond said spacing.

2. The refrigerator defined in the immediately preceding claim wherein said first and second springs are in tension.

3. The refrigerator defined in the immediately preceding claim wherein said resilient bumping means comprises two elements located at opposite sides of said casing.

4. The refrigerator defined in the immediately preceding claim in which the resilient holding means comprises a hinge mechanism having a horizontal hinging axis.

5. The refrigerator defined in the immediately preceding claim in which the horizontal hinging axis is substantially at the same elevation as the center of gravity of said unit and is spaced from said center of gravity.

6. The refrigerator defined in the immediately preceding claim wherein said compressor is a reciprocating compressor having a vertical cylinder located at one end of said casing, and said hinge mechanism has a horizontal hinging axis located at the other end of said casing.

7. The refrigerator defined in the immediately preceding claim in which said bumping elements are so located that a straight line passing through them passes through the center of gravity of said unit.

8. The refrigerator defined in claim 1 in which the resilient holding means comprises a hinging mechanism having a horizontal hinging axis.

9. The refrigerator defined in the immediately preceding claim in which the horizontal hinging axis is substantially at the same elevation as the center of gravity of said unit and is spaced from said center of gravity.

10. The refrigerator defined in the immediately preceding claim wherein said compressor is a reciprocating compressor having a vertical cylinder located at one end of said casing, and said hinge mechanism has a horizontal hinging axis located at the other end of said casing.

11. The refrigerator defined in the immediately preceding claim in which said bumping means comprises two bumping elements which are so located that a straight line passing through them passes through the center of gravity of said unit.

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