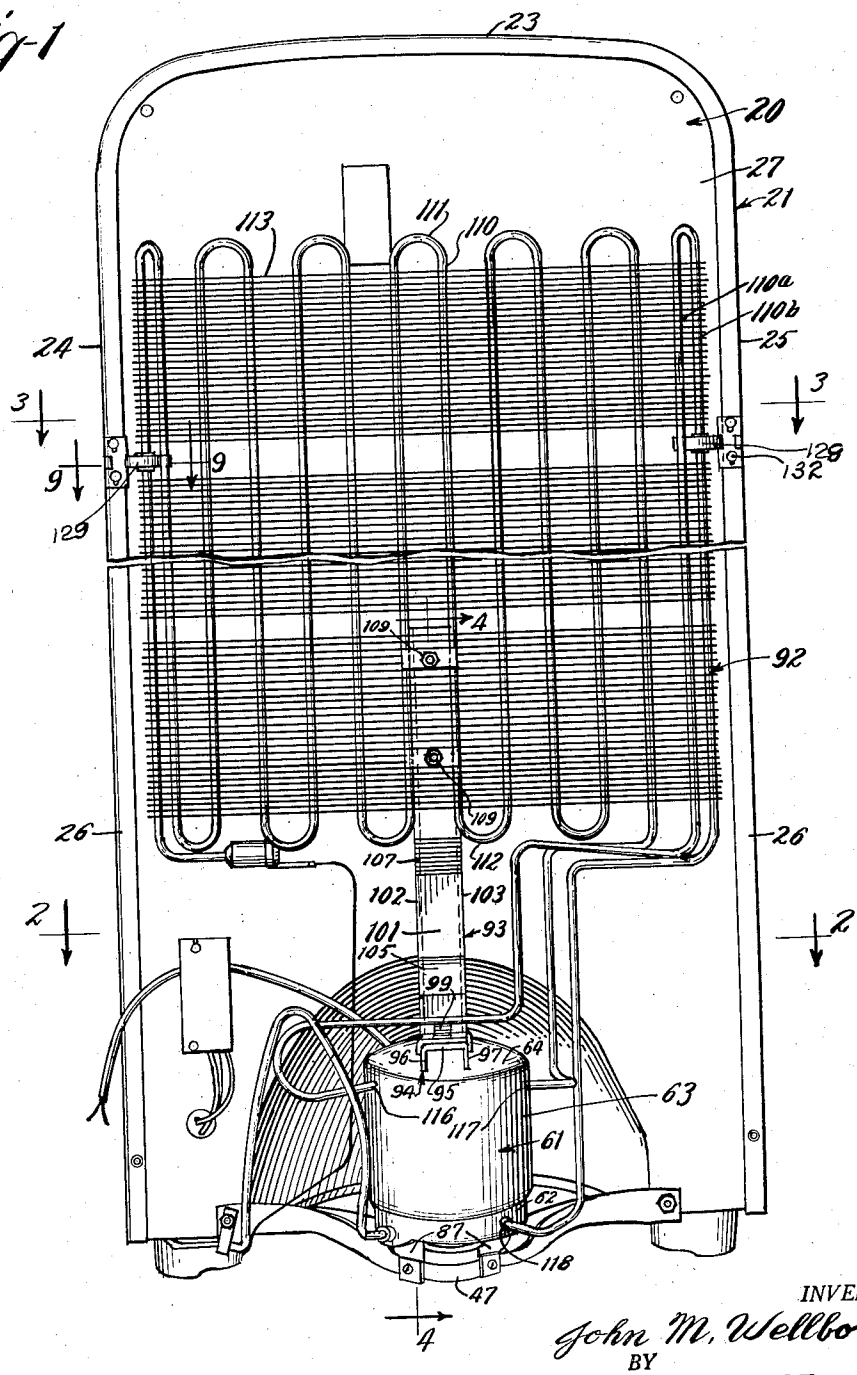
April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

Filed Sept. 27, 1956 7 Sheets-Sheet 1

Fig-1



INVENTOR.

John M. Wellborn

BY

Robert W. Wendt

Atty.

April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

Filed Sept. 27, 1956 7 Sheets-Sheet 2

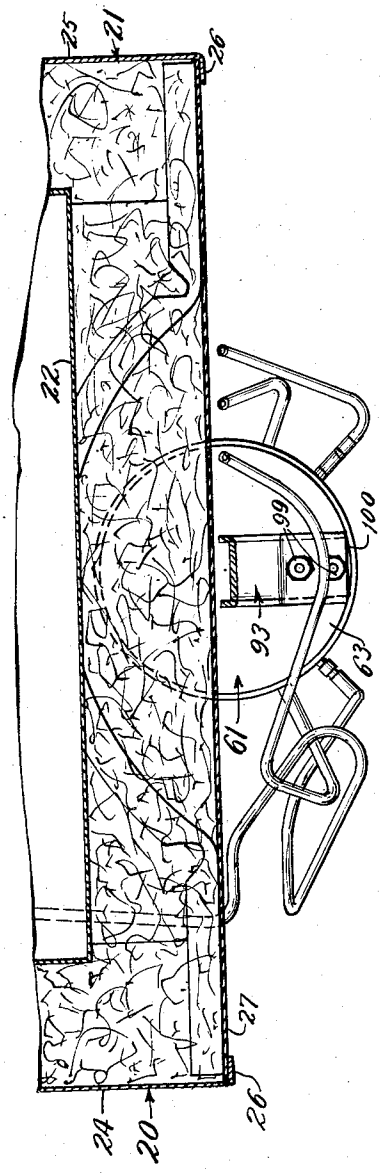


Fig-2

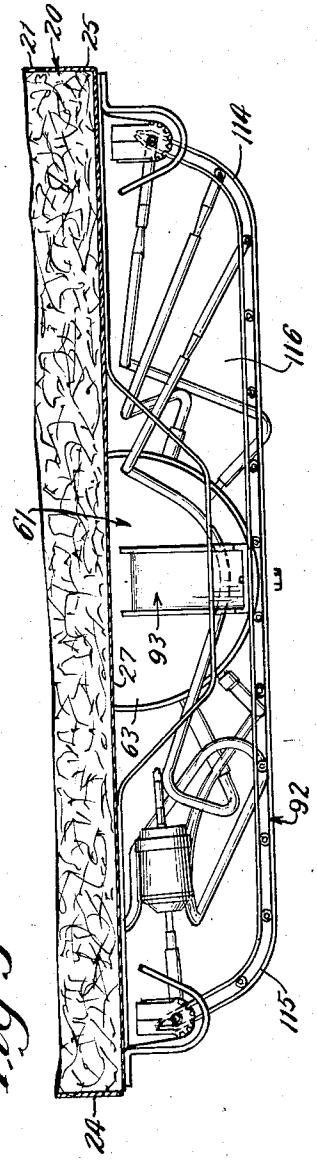


Fig-3

INVENTOR.
John M. Wellborn
BY
Robert W. Wendt
Atty.

April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

Filed Sept. 27, 1956 7 Sheets-Sheet 3

Fig-5

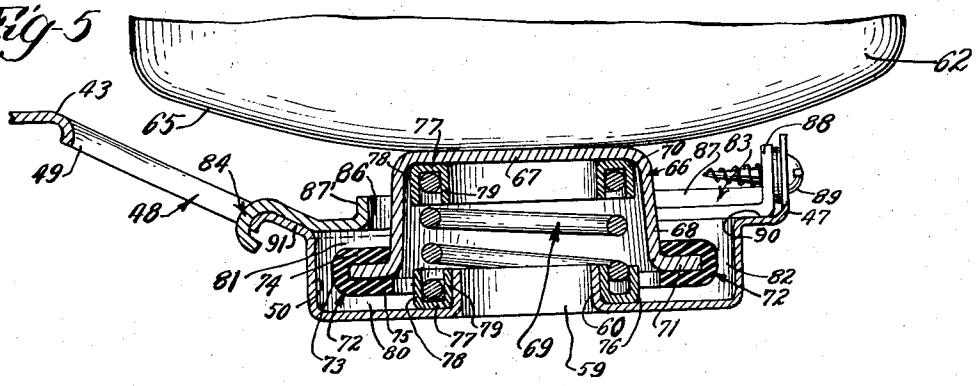


Fig-4

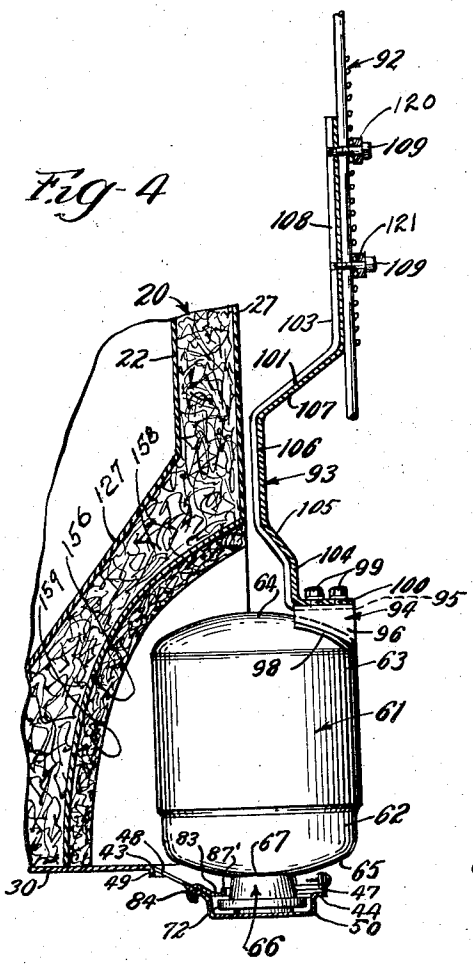
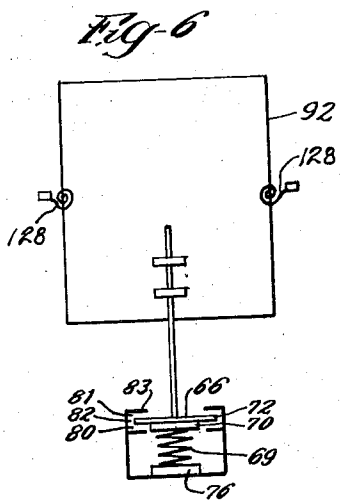


Fig-6



INVENTOR.

John M. Wellborn

BY

Robert W. Wendt

Atty.

April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

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Fig-7

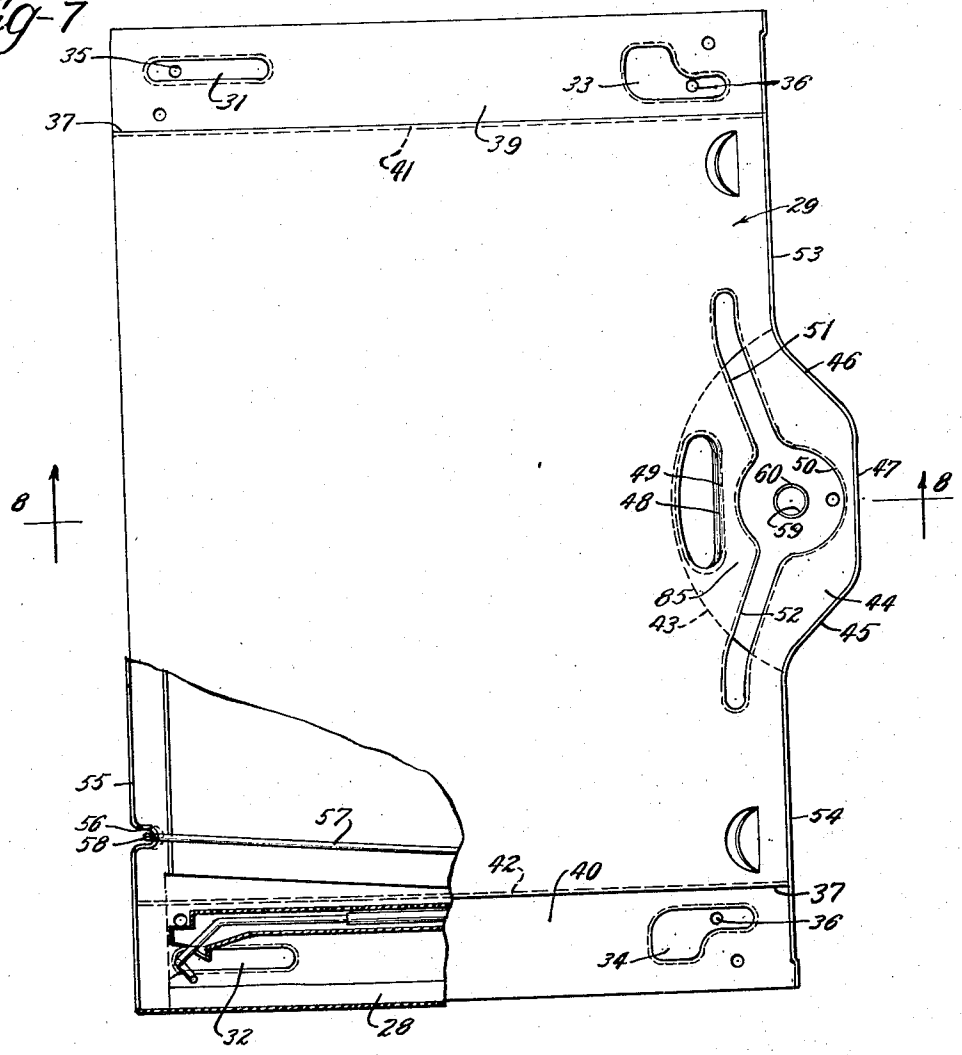
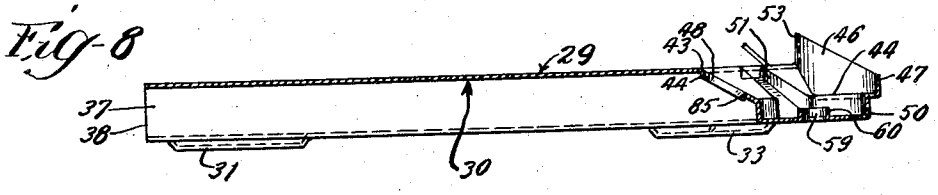


Fig-8



INVENTOR.

John M. Wellborn

BY

Robert H. Tendt

Atty.

April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

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Fig-10

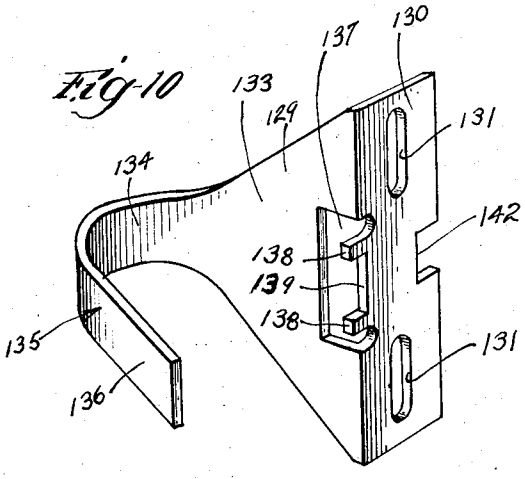


Fig-11

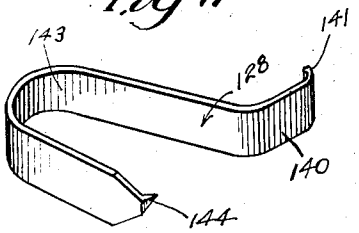


Fig-12

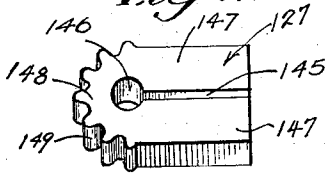
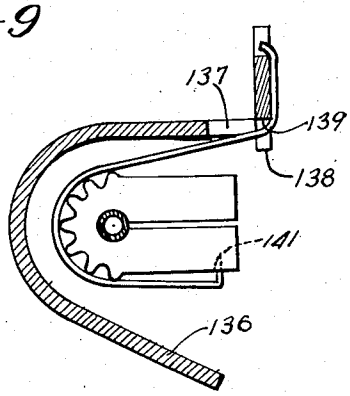


Fig-9



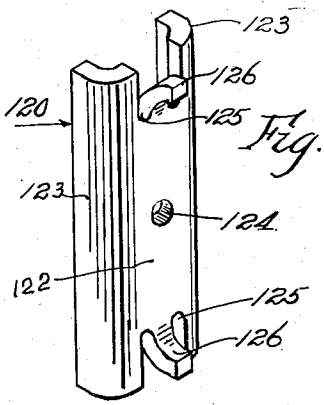


Fig. 16.

INVENTOR.

John M. Wellborn

BY

Robert W. Weindt

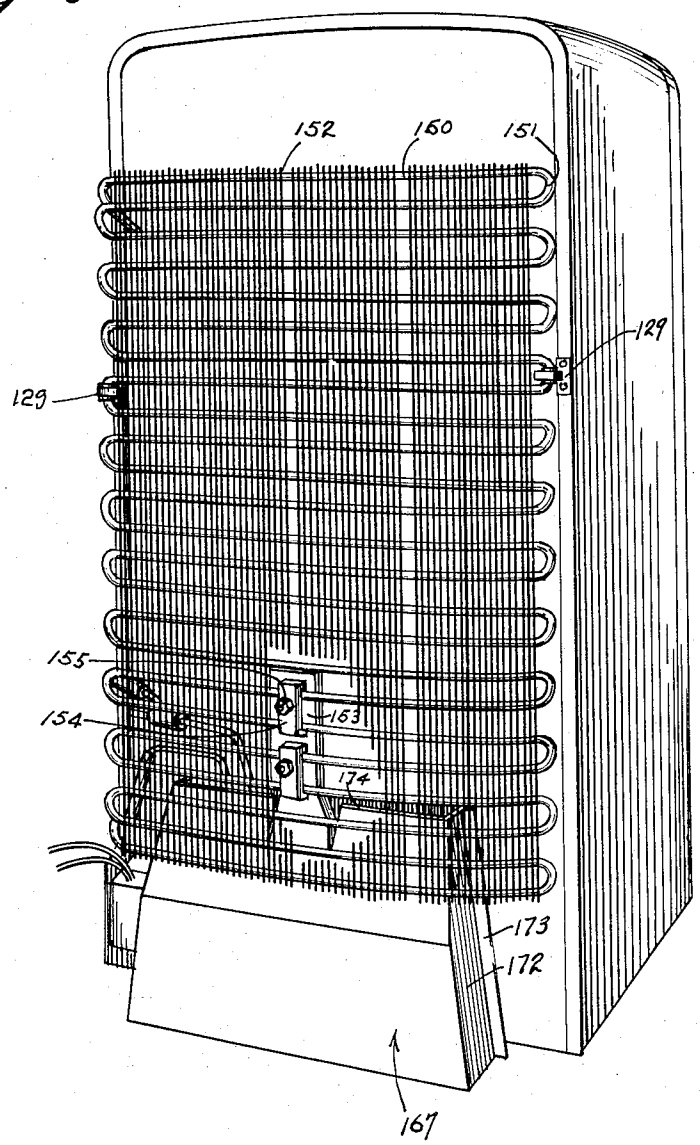
Atty.

April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

Filed Sept. 27, 1956 7 Sheets-Sheet 6

Fig-13



INVENTOR.
John M. Wellborn
BY
Robert W. Jendt
Atty.

April 7, 1959 J. M. WELLBORN 2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

Filed Sept. 27, 1956 7 Sheets-Sheet 7

Fig-15

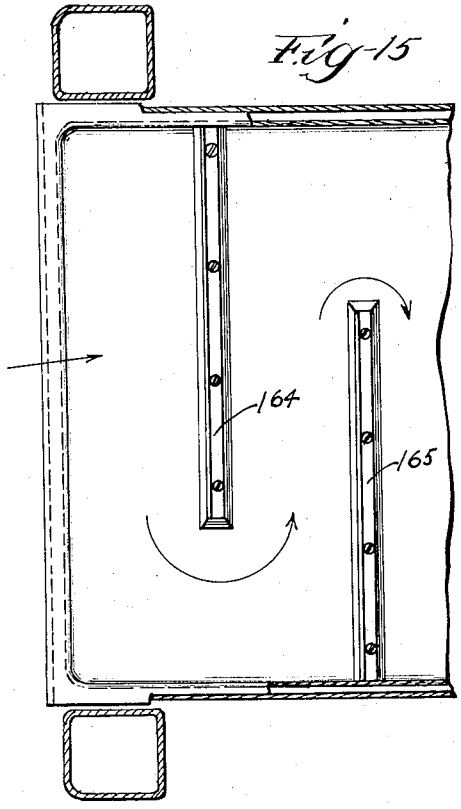


Fig-14

INVENTOR.
John M. Wellborn
BY
Robert W. Jendt
Atty.

United States Patent Office 2,880,597 Patented Apr. 7, 1959

2,880,597

COMPRESSOR-CONDENSER MOUNTINGS FOR HOUSEHOLD REFRIGERATORS

John M. Wellborn, Evansville, Ind., assignor to Whirlpool Corporation, a corporation of Delaware

Application September 27, 1956, Serial No. 612,521

20 Claims. (Cl. 62—279)

The present invention relates to compressor-condenser mountings for household refrigerators and is particularly concerned with improved modes of support of the motor compressor, and the condenser on the shell of the cabinet of household refrigerators.

One of the objects of the invention is the provision of an improved motor compressor and condenser mounting which may be shipped as manufactured and which does not require the tightening of any nuts or bolts for shipping, nor the loosening of any threaded members when it has arrived at the point of use and is to be installed.

Another object of the invention is the provision of an improved mounting for motor compressors which gives a maximum torsional freedom and which is adapted to absorb the torsion jolt that results from the starting of the motor compressor by means of a resilient mounting of the condenser on the cabinet.

Another object of the invention is the provision of an improved motor compressor and condenser assembly in which the precooler is a part of the condenser structure and in which the entire assembly may be handled as a package unit.

Another object of the invention is the provision of an improved condenser mounting which is simpler than the devices of the prior art and which includes a minimum number of supporting devices, utilizing the compressor mount as a part of the support for the condenser also.

Another object of the invention is the provision of an improved condenser mounting which permits the compressor to rotate freely upon a resilient center support while being restrained by the condenser which is rigidly mounted on the motor compressor and resiliently restrained by its connection to the cabinet.

Another object of the invention is the provision of an improved motor compressor and condenser mounting in which the noise caused by the operation of the motor compressor is attenuated and dissipated by the condenser which is rigidly mounted on the motor housing and which has no metallic contact with the cabinet.

Another object of the invention is the provision of an improved cabinet structure, including a bottom panel which is provided with front to rear rails having feet upon which levelling screws may be mounted and having an integral supporting structure for the motor compressor.

Another object of the invention is the provision of an improved center mounting for motor compressors, including a single helical compression spring which is kept out of metallic contact with any part of the cabinet and which is also restrained against movement upward or downward or laterally except for a very limited amount, so that the compressor need not be bolted down during shipment and so that it is ready for installation when it arrives at the point of use.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings of which there are seven sheets:

Fig. 1 is a rear elevational view of a household refrigerator equipped with a motor compressor and condenser mounting embodying the invention;

Fig. 2 is a fragmentary horizontal sectional view taken on the plane of the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a horizontal fragmentary sectional view taken on the plane of the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a vertical fragmentary sectional view taken on the plane of the line 4—4 of Fig. 1, looking in the direction of the arrows;

Fig. 5 is a vertical fragmentary sectional view taken on the same plane as Fig. 4, showing the details of the compressor mounting;

Fig. 6 is a diagrammatic view showing the resilient mountings for motor compressor and condenser and the stops which restrain their movement;

Fig. 7 is a bottom plan view of the lower deck for the cabinet, partially broken away to show the structure above the deck;

Fig. 8 is a sectional view taken on the plane of the line 8—8 of Fig. 7, looking in the direction of the arrows;

Fig. 9 is a fragmentary sectional view of the condenser mounting taken on the plane of the line 9—9 of Fig. 1, looking in the direction of the arrows;

Fig. 10 is a view in perspective of one of the condenser mounting brackets;

Fig. 11 is a view in perspective of one of the condenser mounting springs;

Fig. 12 is a view in perspective of one of the condenser mounting bushings;

Fig. 13 is a view similar to Fig. 1, showing an alternative form of wire condenser, including horizontal passes instead of vertical passes;

Fig. 14 is a vertical sectional view similar to Fig. 4 of the modification in which the condenser has laterally extending passes and also showing the preferred form of enclosing housing and condensate pan;

Fig. 15 is a fragmentary horizontal sectional view taken on the plane of the line 15—15 of Fig. 14;

Fig. 16 is a view in perspective of the condenser clamping bracket.

Referring to Figs. 1, 2 and 7, 20 indicates in its entirety a household refrigerator comprising a cabinet having an outer shell 21 and an inner liner 22 separated from each other by suitable insulation and having the usual front door opening in both shell and liner.

The outer shell 21 may comprise a side wall and top wall unit having an integral top 23 joined to the two side walls 24 and 25 of the shell. The side walls 24, 25 and top 23 are provided with the integral inwardly extending flange 26, to which a back panel 27 is attached. The side walls also have inwardly extending foot flanges 28 at each side at the bottom for attachment to the bottom panel 29.

At its front the cabinet is provided with the usual breaker strip extending from liner to shell around the door opening and with the usual insulated and sealed door.

The bottom panel 29 comprises an integral stamped sheet metal member of generally rectangular shape as shown in Fig. 7, including a bottom wall 30 having a plurality of stamped foot depressions 31—34 for supporting the cabinet on the floor.

The front foot flanges 31, 32 may be elongated oval depressions in the bottom panel and they are preferably located quite close to the front and provided with threaded apertures 35 close to the front for receiving levelling screws.

The rear foot flanges 33, 34 are of larger area comprising a rounded body and a rearwardly extending narrower part. These also are provided with threaded bores 36 for receiving leveling screws.

The bottom panel 29 has upwardly extending side walls 37 on each of its lateral sides, but is open at 38 at its front end for permitting air circulation. The bottom 30 of the bottom panel 29 is in the form of a pair of front-to-back extending rails 39 and 40 which carry the feet 31—34.

The rails have inner walls 41 and 42 extending up to the main body 30 of the bottom panel which is located on a higher plane between the two rails 39 and 40.

At its rear end the body 30 of bottom panel 29 is bent downwardly along a partially circular line 43 forming a depressed compressor supporting portion 44 which bulges outwardly with diagonal borders 45, 46 and horizontal back wall 47.

The bottom panel body 30 is provided with an oval aperture 48 just outside the curved line 43 which represents a downward bend and aperture 48 is bordered by a downwardly extending narrow flange 49 stiffening this portion of the panel.

The compressor supporting portion 44 is formed with a substantially circular stamped depression 50 in its center, this depression having a pair of laterally extending pressed arms or ribs 51, 52 for stiffening and reinforcing the bottom panel about the compressor supporting depression 50. The bottom panel is welded to the shell flanges 28 and also has upwardly extending border flanges 53, 54 at the rear which are welded to the rear panel 27.

At its front edge, bottom panel 29 has an upwardly extending flange 55 formed with a pressed vertical trough 56 for housing a suction tube 57 which turns upward at 58 and extends to the outlet of the second evaporator (not shown).

The central depression 50 is formed with a central aperture 59 having an upwardly extending tubular portion 60 which engages inside the compressor supporting spring. The depression 50 forms a seat for the spring which is centered by the tubular portion 60.

The motor compressor 61 has an outer metal housing which may comprise a lower oil sump 62 and an upper motor housing portion 63 welded together and providing a sealed unit.

The top wall of the motor housing 63 is curved as indicated at 64. The bottom sump 62 is also curved as indicated at 65. Central cup shaped member 66 (Fig. 5) is welded to the bottom of the sump 62.

This cup shaped member has an upper circular wall 67 that is welded to the motor compressor housing and centrally located on it in the axis of the vertically extending shaft 68 which is the common shaft for motor and compressor and carries the armature 69*a*.

The top wall 67 of cup 66 has a downwardly extending and upwardly tapered cup wall 68. The size of the cup is sufficient to receive the helical coil spring 69 with its resilient rubber cover 70.

The side wall 68 of the cup has an outwardly extending lateral flange 71 at its lower end. This flange is covered by a resilient rubber covering 72, which may be U shaped in cross section, having a yoke 73 joining two annular inwardly extending flanges 74, 75 of resilient rubber. This cover 72 is of a size to grip the flange 71 tightly on which it is held by friction. The cover 72 is preferably an endless resilient rubber member tensioned about flange 71.

The helical coil spring 69 is relatively heavy and provided with a plurality of spaced turns of cylindrical spring wire. The spring is provided at its upper and lower ends with the resilient rubber covers 70 and 76 which may be identical in construction.

Each of these rubber coverings has a U-shaped across section, being provided with a yoke 77 and two cylindrical integral side walls 78 and 79. Thus, each of the rubber members 70 and 76 fits one end of the spring and prevents metal-to-metal contact between the spring and the cabinet and between the spring and the motor compressor housing.

The length of the spring and the depth of the cup 66 and the depth of the depression 50 is such that the motor compressor 61 is supported in spaced relation to all of the other metal parts of the deck and cabinet, and in particular there is a clearance at 80 below the rubber covering 72 and a clearance at 81 above the rubber covering 72, but this clearance is limited and permits only a small amount of up or down movement of the motor compressor relative to the bottom deck.

There is also a clearance at 82 inside the depression 50 and between its wall and the rubber covering 72, so that the depression 50 acts as a stop, preventing movement of the motor compressor in the depression 50 beyond a limited amount.

The helical spring 69, being a substantial fit in the cup 66 and about the tubular portion 60, the spring tends to keep the motor compressor centered with respect to the depression 50.

In order to limit the upward movement of the motor compressor, the depression 50 is provided with an apertured cover plate 83 (Fig. 5) which comprises a metal stamping having a partially cylindrical hook formation 84 at its inner end for hooking in the aperture 48 about the tubular portion 49.

The hook 84 slopes downward and fits against the adjacent wall 85 at the bottom 44. The cover plate 83 has a U-shaped slot 86 bordered by an upwardly extending flange 87 which is spaced from the cup 66 a greater distance than the clearance 82.

The slot 86 is bordered by two forwardly extending legs 87 which are turned upwardly at attaching flange 88, fitting inside the back flange 47.

Self-tapping screws 89 extend through the flange 47 and into the attaching flange 88 of each leg 87 and support the cover plate 83 against the shoulder 90 at the rear and the shoulder 91 near the hook 84.

The two legs 87 have a clearance with respect to the cup 66 which is greater than the clearance 82. Thus, the cover plate 88 limits the upward movement of the motor compressor 61 to the amount permitted between rubber covering 72 and lower surface of cover plate 83, that is the clearance 81.

Thus, the motor compressor is resiliently supported at its central axis by a metallic spring which is rubber insulated from all of the adjacent metal parts. The motor compressor may move upwardly, laterally, or downwardly a slight amount, but is confined in its place by the cup 66 in the depression 50 and below the plate 83.

The compressor may rotate, subject to friction between its cup and the spring sound insulators 70 and 76, but this rotation is resisted by the condenser mountings, further to be described.

The condenser is indicated in its entirety by 92 (Fig. 1 or the horizontal pass type shown in Fig. 13). The condenser is rigidly supported on the compressor 61 by a condenser supporting bracket or channel 93.

For this purpose the top 64 of the motor compressor housing has a substantially U-shaped mounting bracket 94 which has an upper yoke 95 (Fig. 1) and two downwardly extending flanges 96, 97, which are welded to the motor housing.

The flanges 96 and 97 have curved lower edges 98, so that they fit on the top 64 adjacent one of the sides that is rear side of the motor compressor 61. Threaded apertures are provided in the supporting bracket 94 for receiving two screw bolts 99 which pass through attaching flange 100 on the channel 93 and secure this channel rigidly to the motor compressor housing.

The channel 93 comprises an elongated channel mem-

ber having a central yoke 101 and a pair of side flanges 102, 103 which fit over and about the bracket 94. The side flanges stiffen the channel 93 which extends upwardly at 104 and has a diagonal off-set at 105.

The channel extends upwardly again at 106 where it is located substantially in the axis of the motor compressor. The channel has a diagonal portion 107 and a vertical attaching portion 108 which is provided with a pair of threaded bores for the screw bolts 109.

The condenser 96 comprises a plurality of vertical passes of tubing indicated at 110 in Fig. 1, joined by upper U-shaped formations 111 and lower U-shaped formations 112.

These passes are uniformly spaced and integrally welded to a multiplicity of horizontally extending wires 113 close to each other and located on both sides of the tube in alignment with each other.

The entire assembly of wires is bent forwardly at 114 and 115 on each side, so as to form a chimney space 116 for the upward passage of air by convection.

The two vertical passes 110*a* and 110*b* are used for a precooler and the remainder of the vertical passes constitute the main condenser, all of these passes being secured to the same multiplicity of horizontally extending wires 113 welded to the tubes.

The wires, which are omitted in Fig. 1, are merely omitted from the drawing to permit the adjacent parts to be made more visible. The tube is covered with the wires on both sides from top to bottom.

The bolts 109 pass through central apertures in the U-shaped clamp members 120, 121 and extend between the wires and tubes into threaded bores in the channel 93 at the vertical portion 108.

The wires may be bent apart to make room for the bolts 109 and the clamps 120, 121 engaging the adjacent wires and preferably are long enough to extend to a point outside of the adjacent tubes clamping the condenser 92 rigidly to the channelled member 93.

The condenser clamps 120, 121 are shown in greater detail in Fig. 16. Each clamp comprises a channel member having a flat yoke 122 engaging the wires and lateral flanges 123 extending between the wires into engagement with the tubes.

The clamp has a central aperture 124. Its yoke is provided with a pair of inwardly extending slots 125 at each end providing a central tongue 126 which is bent inward to curve about the adjacent tubes. Thus the clamp so engages the condenser that the condenser cannot slide relative to the clamp because of the location of the flanges 123 between the wires and because of the curvature of the tongues 126 about the tubes.

The condenser is given additional support near its top by a resilient condenser mounting bushing 127 (Fig. 12) carried by a condenser stabilizer spring 128 which is carried by a condenser snubbing bracket 129 on each side of the cabinet at the back panel.

The condenser snubbing bracket 129 comprises a rigid sheet steel member having an attaching flange 130 which is provided with a pair of oval apertures 131 for the passage of screw bolts 132 which extend through these apertures and are threaded into the rear flange 26 of the shell. The elongated apertures 131 permit some adjustment of the position of the bushing 127 between the wires.

Bracket 129 has an outwardly extending tapered flange 133 which terminates in a metal strip 134 formed into a substantially U-shaped member 135.

The U-shaped member 135 has its outer flange 136 extending diagonally outward as shown in Fig. 9, permitting a wider range of movement at that point.

The bracket 129 has a rectangular cut out at 137 which has a pair of inwardly extending lugs 138 separated by a rectangular groove 139 at the border of the attaching flange 130. Groove 139 is adapted to receive part of the stabilizer spring 128 when its arranged between the lugs 138 as shown in Fig. 9.

The stabilizer spring 128 has an attaching flange portion 140 with a backwardly turned curved end 141. The end extends into a notch 142 of the attaching flange 130 of bracket 129.

Spring 128 has a substantially U-shaped portion 143 which extends into the U-shaped hook 135 of the bracket 129 and is initially bent inward until it is smaller than the bushing 127 which it is designed to clamp. Spring 128 terminates in an inwardly extending prong 144 that engages in the bushing 127 as shown in Fig. 9.

The bushing 127 is preferably made of resilient rubber and it comprises a substantially rectangular member having a central slit 145 leading to an aperture 146, adapted to receive the outermost tube of the condenser.

The two legs 147 of the bushing 127 are forced apart to place them about the end tube 110*b*, for example, and the bushing 127 is then embraced by the spring 128. The bushing 127 may have a circular end or yoke 148 provided with scallops 149 resiliently engaging spring 128.

The spring 128 is clamped between the flange 26 of the cabinet and the attaching flange 130 of the bracket 129 by means of the screw bolts 132.

Referring to Fig. 13, this shows a modification of the condenser in which the passes of tubing 150 extending horizontally and are joined by U-shaped formations 151 at each end. The tubing passes 150 are integrally welded vertically extending wires 152 which are located on both sides of the tubing, front and back, and welded thereto in alignment with each other.

In this case, two of the U-shaped formations 151 are used to be engaged by the bushings 127 carried by springs 128, supported by brackets 129 to limit the rotation of the condenser and the compressor to which it is attached. In this case, the compressor supports a similar upwardly extending channel 153 to which the adjacent passes of tube are clamped by means of vertical clamp 154 and screw bolts 155 threaded into channel 153 which is carried by motor compressor.

In each case the condenser is rigidly attached to the motor compressor and carried by an axially extending member substantially in the axis of the motor shaft. The operation of the compressor and condenser mount is as follows.

The spring 69 supports the compressor and the weight of the condenser also at the axis of the compressor and motor but permits a very limiting movement in all directions. The compressor is insulated from the cabinet by the rubber covering for the spring. It is also insulated from the cabinet by the rubber cover 72 for the spring supporting cup 66. The condenser is insulated from the cabinet by the rubber bushings 127.

While the compressor is running any vibration of it is caused by the unbalance of its rotating parts causing the compressor to vibrate freely on its simple supporting spring 69 carrying with it the condenser to which the vibrations are transmitted and by which they are attenuated.

When the compressor motor is started, there is a backward torque on the motor housing which is transmitted to the condenser and which is resisted by the stabilizer springs 128. These springs permit the condenser to rotate backward in the opposite direction to the rotation of the armature, momentarily, but as soon as the motor is run, the position of the condenser is again centralized and stabilized by the springs 128.

Due to the fact that the cup 66, which supports the compressor, is limited in its movement in all directions, the motion of the condenser is correspondingly limited by the brackets 129. It is not necessary to bolt down the compressor during shipment and the installer of the refrigerator does not need to loosen any bolts after the refrigerator has been installed in a home.

The motor compressor is mounted in a cavity 156

located in the lower rear corner of the shell **21**. The liner **22** has a diagonal wall **127** adjacent this cavity but separated therefrom by suitable insulation **158**.

In order that the noise of the motor compressor may be muffled, cavity **156** is lined with sound insulation material **159**, such as sheet felt or a sheet of sponge rubber. This sound insulating material also preferably extends at **160**, Fig. 14, over the bottom panel where the side rails **39** and **40** are provided with inwardly extending guides **161** for slidably supporting a condensate pan **162** which has lateral flanges **163** engaging said guides.

The condensate pan has upwardly extending pressed ribs **164** extending from its opposite sides and provided with angular baffles **165**, **166** engaging the sound insulation **160**. The course of the air is shown by the arrows in Figs. 14 and 15 under the condensate in the pan **162** and at the front and out the back over the motor compressor.

The condensers of both types are preferably provided with a covering housing **167** for the motor compressor. This housing has an extending flange **168** at the bottom engaging under the rim flange **169** of the condensate pan **162**. The compressor housing has an upwardly extending wall **170** and an inwardly sloping wall **171** which extends upwardly between the back panel and the condenser.

The housing **167** has two side walls **172** and is secured to the back panel by flanges **173** but is open at the top **174**, inside the chimney of the condenser. This housing is also provided with a layer of sound insulating material **175** on all of its inside walls, thus the noise of the motor compressor operation is absorbed by this sound insulating material and the noise that is audible is substantially reduced.

It will thus be observed that I have invented an improved motor compressor and condenser mounting which includes a minimum number of parts and which is simple in construction and does not require any adjustment of the parts at the point of installation. The motor compressor and condenser permit a maximum degree of torsional freedom consistent with a mounting that is capable of being shipped without regarding special shipping rules.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails.

2. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails, each of said bottom rails being provided with a downwardly pressed foot formation having a plane bottom surface.

3. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails, each of said bottom rails being provided with a downwardly pressed foot formation having a plane bottom surface, and each of said foot formations being provided with a threaded bore for receiving a leveling screw comprising a disc and a threaded shank.

4. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails, said bottom panel having front and rear upwardly extending border flanges, and said front border flange being formed with an integral backwardly pressed groove formation, for passing a refrigerant tube.

5. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails, the said bottom panel being formed at its central and rear edge with an integral downwardly pressed shallow cavity having a centrally located further cylindrical depression provided with a central upwardly extending tubular formation for supporting a single compressor mounting spring.

6. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails, the said bottom panel being formed at its central and rear edge with an integral downwardly pressed shallow cavity having a centrally located further cylindrical depression provided with a central upwardly extending tubular formation for supporting a single compressor mounting spring, the said first-mentioned depression having at its forward edge an elongated aperture for passage of air through the bottom panel to the space above said depressions for cooling equipment mounted there.

7. A refrigerator cabinet comprising an outer shell and an inner liner separated by insulation, the said outer shell

comprising a pair of side walls, a top wall, a rear panel, and a bottom panel, the said side walls having inwardly extending flanges at the bottom, and said bottom panel comprising an integral rectangular metal sheet formed at each of its lateral sides with a downwardly pressed rail formation extending from front to back, and said bottom panel having an elevated central body between said rails, leaving an air space between the said rails for circulation of air and reception of a condensate pan, the said cabinet being supported by said bottom rails, the said bottom panel being formed at its central and rear edge with an integral downwardly pressed shallow cavity having a centrally located further cylindrical depression provided with a central upwardly extending tubular formation for supporting a single compressor mounting spring, the said first-mentioned depression having at its forward edge an elongated aperture for passage of air through the bottom panel to the space above said depressions for cooling equipment mounted there, said bottom panel carrying a spaced plate above said circular depression, said plate having a hook in said elongated aperture, and having threaded means for securing it to the rear edge of the bottom panel.

8. A compressor condenser mounting assembly comprising a refrigerator cabinet having a bottom panel forming part of a shell, said bottom panel being formed with a stamped depression adjacent its rear edge, a single spring mounted in said depression and supporting a motor compressor for resilient movement relative to said cabinet, a condenser assembly rigidly mounted on an upwardly extending standard carried by said motor compressor, and means carried by the cabinet for supporting said condenser in substantially vertical position spaced from the cabinet and resiliently mounted with respect to the cabinet. the said latter means comprising a resilient non-metallic member in each case surrounding a condenser part, and a resilient metal spring carried by the cabinet and embracing the non-metallic member for insulating the condenser from the cabinet, but permitting rotative movement of the condenser with the motor compressor.

9. A compressor condenser mounting assembly comprising a refrigerator cabinet having a bottom panel forming part of a shell, said bottom panel being formed with a stamped depression adjacent its rear edge, a single spring mounted in said depression and supporting a motor compressor for resilient movement relative to said cabinet, a condenser assembly rigidly mounted on an upwardly extending standard carried by said motor compressor, and means carried by the cabinet for supporting said condenser in substantially vertical position spaced from the cabinet and resiliently mounted with respect to the cabinet, the said latter means comprising a resilient non-metallic member in each case surrounding a condenser part, and a resilient metal spring carried by the cabinet and embracing the non-metallic member for insulating the condenser from the cabinet, but permitting rotative movement of the condenser with the motor compressor, and said means also comprising a rigid metal U-shaped member carried by the cabinet, and embracing the non-metallic member and metal spring and condenser part for definitely limiting the rotative movement of the condenser on the cabinet.

10. A motor compressor mounting comprising a cabinet part having a lower upwardly open round stamped depression formed with a central upwardly extending spring seat, a single coil spring on said spring seat, a motor compressor having an axially extending housing provided with a cup shaped spring seat centrally secured to its bottom, said spring engaging in said cup, and comprising the sole support for said motor compressor, and means carried by said motor compressor and cabinet for preventing any more than a limited amount of rotative movement of the motor compressor on said spring, the said spring being provided upon one of its ends with an annular resilient non-metallic covering of substantially U cross section for sound insulating the spring from the adjacent metal parts, and having a second covering on the other end of the spring for sound insulating the spring and motor compressor from the cabinet.

11. A motor compressor mounting comprising a cabinet part having a lower upwardly open round stamped depression formed with a central upwardly extending spring seat, a single coil spring on said spring seat, a motor compressor having an axially extending housing provided with a cup shaped spring seat centrally secured to its bottom, said spring engaging in said cup, and comprising the sole support for said motor compressor, and means carried by said motor compressor and cabinet for preventing any more than a limited amount of rotative movement of the motor compressor on said spring, the said cup having an outwardly extending radial flange in said depression, and said depression being closed by a fixed cover plate with an aperture surrounding and spaced from said cup, said radial flange spaced slightly from said fixed cover plate and from the bottom of said round depression definitely limiting the movement of the motor compressor in all directions, and eliminating the necessity for securing the compressor down during shipment.

12. A motor compressor mounting comprising a cabinet part having a lower upwardly open round stamped depression formed with a central upwardly extending spring seat, a single coil spring on said spring seat, a motor compressor having an axially extending housing provided with a cup shaped spring seat centrally secured to its bottom, said spring engaging in said cup, and comprising the sole support for said motor compressor, and means carried by said motor compressor and cabinet for preventing any more than a limited amount of rotative movement of the motor compressor on said spring, the said cup having an outwardly extending radial flange in said depression, and said depression being closed by a fixed cover plate with an aperture surrounding and spaced from said cup, said radial flange spaced slightly from said fixed cover plate and from the bottom of said round depression definitely limiting the movement of the motor compressor in all directions, and eliminating the necessity for securing the compressor down during shipment, said radial flange being provided with an annular, resilient, non-metallic covering of U cross section to sound insulate the radial flange from adjacent parts in the event of contact during operation of the motor.

13. A motor compressor mounting for refrigerator cabinets, comprising a bottom plate for the cabinet, said plate having a downwardly extending cylindrical formation formed therein and having an upwardly extending, centrally located cylindrical flange in said formation, a helical coil spring having one end seated about said cylindrical flange, a cylindrical metal cup inverted and located on the other end of said spring, said cup having a radial flange on its open lower end, the edge of said radial flange being slightly spaced from the bottom of said formation, a cover plate for said formation secured to said bottom plate and having an aperture slightly spaced from said cup, said cover being also slightly spaced from said radial flange, and a motor compressor having a housing secured to said inverted cup on the top of said cup and with the axis of said cup in alignment with the axis of said housing and with the axis of the motor compressor in said housing, the slight spacing between said cup and said cover aperture and between said radial flange and said cover and said formation limiting the movement of the motor compressor relative to the cabinet in all directions for shipment.

14. A motor compressor mounting according to claim 13, in which said radial flange and the ends of said helical coil spring are each covered by a rubber ring of U-shaped cross section for absorbing the vibration of said motor compressor and reducing transmission of noise due to vibration from the motor compressor to the cabinet.

15. A condenser mounting assembly for a heat radiating condenser of a household refrigerator having a rear cabinet panel and a plurality of passes of metal tubing provided with a multiplicity of transverse wires welded to each pass at each transverse wire, comprising a rigid U bracket having an attaching flange secured to said rear panel and holding the open side of the U bracket toward the panel about one of said tubing passes, a U-shaped rubber bushing fitting about the tubing and located in said bracket, and a U-shaped metal spring having an attaching flange secured between the bracket and the panel and extending about the bushing to support the bushing resiliently, said rigid U shaped bracket limiting the tubing motion relative to said panel.

16. A condenser mounting assembly according to claim 15, in which the rubber U bushing is anchored in the rigid U bracket by an inwardly turned anchoring prong on said spring, said prong being located on the free end of said U spring and extending into the body of said U bushing to anchor the bushing in the spring.

17. A motor compressor and condenser mounting assembly on a refrigerator cabinet having a back panel and a bottom panel, comprising a motor compressor having a cylindrical housing containing a motor compressor with a vertical shaft, a rigid condenser bracket secured to the top of the motor compressor housing and extending upward therefrom, a condenser comprising multiple passes of tubing secured to heat radiating members extending transversely to the tubing, threaded members and clamps clamping said tubing to said condenser bracket, a central helical coil spring supported in a cup carried by the bottom panel and seated in an inverted cup carried by

the bottom of said housing resiliently supporting the motor compressor and condenser assembly to absorb vibration and permit rotation of the assembly relative to the cabinet on starting of the motor, and a pair of rigid U brackets carried by the back panel and embracing one condenser tube at each lateral edge of the condenser to limit the rotative movement of the assembly relative to the cabinet.

18. A motor compressor and condenser mounting assembly according to claim 17, in which the U brackets support rubber bushings fitting about the condenser tubing and the coil spring is covered with a ring of rubber of substantially U shape in cross section extending over each of the ends of the spring for absorbing vibration.

19. A motor compressor and condenser mounting assembly according to claim 17, in which the inverted cup on the motor compressor housing is limited in movement upward or downward or laterally by the walls of the cup carried by the bottom panel and by an apertured cover for said latter cup carried by the bottom panel.

20. A motor compressor and condenser mounting assembly according to claim 19, in which said inverted cup has a rubber covered radial flange confined between the cup carried by said bottom panel and said cover.

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