May 2, 1950 G. G. GROSH 2,505,959

MOUNTING FOR VIBRATING MACHINERY

Filed May 24, 1947

Fig. 1.

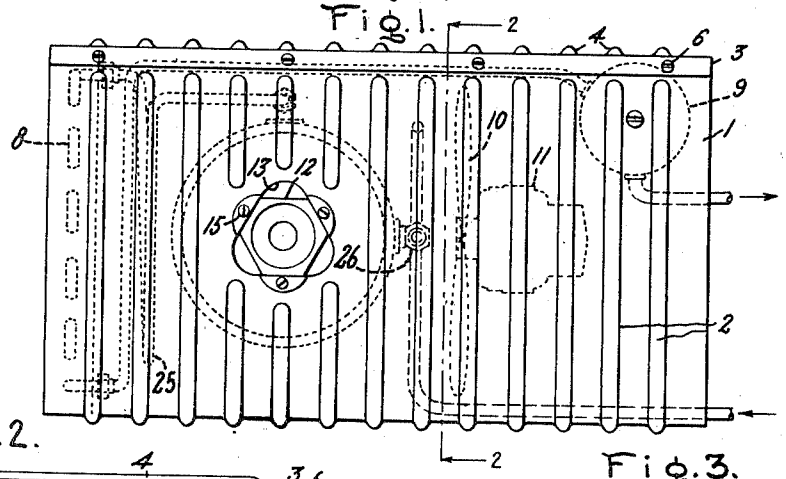


Fig. 2.

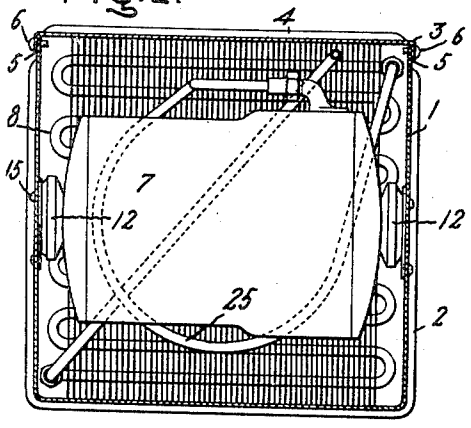


Fig. 3.

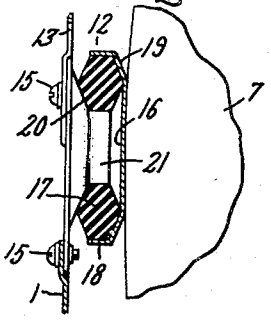
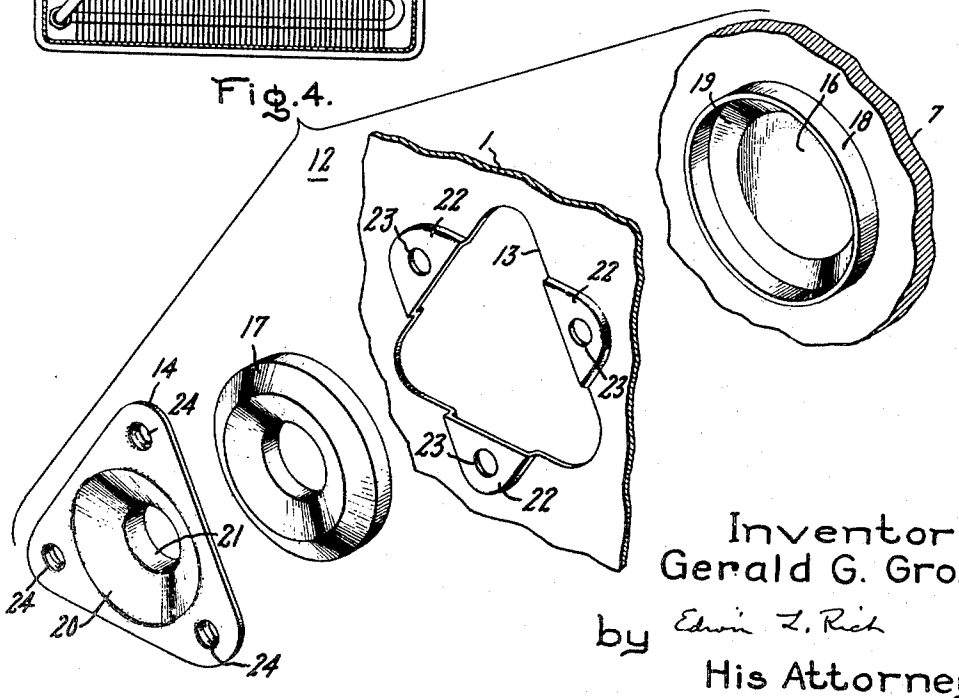


Fig. 4.



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MOUNTING FOR VIBRATING MACHINERY

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7 Claims. (Cl. 248—26)

1

My invention relates to resilient mountings for vibrating machines and particularly to arrangements for mounting vibrating apparatus, such as the motor-compressor units of refrigerating machines, in enclosing casings or housings.

It is a general practice to mount vibrating machinery on resilient supports to minimize the transmission of vibration to the supporting structure. Many vibrating devices are mounted within housings or casings which make them relatively inaccessible. For example, in a refrigerating apparatus the motor-compressor unit may be mounted in an enclosure through which air is circulated. It may be desirable to mount the motor-compressor unit or other apparatus resiliently within the enclosure which requires the location of the resilient supports in relatively inaccessible positions. It is desirable to make the resilient mountings detachable so that the vibration producing device, such as a motor-compressor unit, may be removed and also so that the resilient members may be replaced or otherwise serviced in the event of deterioration or wear. Accordingly, it is an object of my invention to provide a resilient mounting for securing vibrating apparatus adjacent a supporting wall structure and including an improved arrangement for affording ready access to the mounting device.

It is another object of my invention to provide an improved arrangement for resiliently mounting the refrigerator motor-compressor units and similar devices within closed housings and including an arrangement for obtaining ready access to the parts of the mounting.

Further objects and advantages of my invention will become apparent as the following description proceeds, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention reference may be had to the accompanying drawing in which Fig. 1 is a side elevation view of a refrigerant condensing unit provided with a motor-compressor unit embodying my invention; Fig. 2 is a sectional view on the line 2—2 of Fig. 1; Fig. 3 is an enlarged detail sectional view of the resilient mounting structure; and Fig. 4 is an exploded perspective view of the parts of the mounting structure shown in Fig. 3 with the removable parts in position outside the unit prior to assembly.

Referring now to the drawing, the refrigerant condensing unit shown in Figs. 1 and 2 comprises

2

an open ended elongated housing or duct structure 1 of square cross section. The bottom and side walls of the housing are formed from a single piece of sheet steel provided with reinforcing corrugations 2. The top wall of the housing comprises a plate 3 of sheet steel provided with reinforcing corrugations 4 and having side flanges 5 bent downwardly and detachably secured to the tops of the side walls by suitable means, such as machine screws 6. Within the housing 1 are mounted a motor-compressor unit 7, a finned tube condenser 8 and a liquid refrigerant receiver 9. In order to circulate air over the unit 7 and condenser 8, a fan 10 driven by a motor 11 is mounted within the housing. The condenser 8 and the supporting structure (not shown) for the motor 11 and also a suitable shroud (not shown) for the fan 10 all constitute structural parts of the unit connected between the side walls of the housing 1 and serve to reinforce the structure.

The motor-compressor unit 7 is mounted between the side walls of the housing on resilient mounting devices 12 which are so constructed and arranged that they may be detached for servicing or removal without requiring access from within the housing, it being evident that such access is rendered difficult by the nearness of the side walls to the ends of the units even after the top wall has been removed. The two resilient mounting devices are identical and are constructed as shown in detail in Figs. 3 and 4. Each of the side walls of the housing is provided with an equilateral triangular opening 13 adjacent the corresponding end of the motor-compressor unit 7. Each end of the unit 7 is supported on the adjacent side wall by one of the resilient mounting devices 12 each of which comprises a plate 14 secured to the side wall by screws 15, a cup 16 welded or otherwise suitably secured to the unit 7, and a ring 17 of rubber or other suitable resilient material mounted between the cup 16 and the plate 14. The ring 17 preferably is not bonded to the cup and the plate but is held in place by friction and may be rotated with respect to the plate and cup. The cup 16 is provided with an outer flange 18 which confines the ring 17 and also with a sloping flange 19 connecting the base of the cup and the flange 18 so that lateral forces are transmitted between the flange 19 and a corresponding sloping flange 20 formed on the plate 14. The inner side of the ring 17 is engaged by a flange 21 on the plate 14 extending axially from the flange 20. It will thus be apparent that the ring 17 is re-

tained vertically in position between the flanges 18 and 21 and laterally against compressive forces between the flanges 19 and 20. As clearly shown in Fig. 4, the plate 14 is in the form of an equilateral triangle of the same shape as the opening 13 but of somewhat smaller size so that when it is in alignment with the opening 13 it may pass laterally therethrough from the housing to a position outside the housing such as shown in Fig. 4. When the plate is in position on the housing 1, its three corners fit in pockets 22 pressed into the housing walls on the inner sides thereof and the screws 15 pass through holes 23 in the pockets and engage threaded openings 24 in the plate 14. Thus when the plate is in position in the pockets, it is held rigidly against displacement and constitutes a secure support for the motor-compressor unit. When it is desired to remove the resilient mounting, the screws 15 are removed and the plate 14 is pressed inwardly against the resilience of the ring 17 so that the corners of the plate clear the sides of the pockets 22 whereupon the plate 14 may be rotated into its position of registry with the opening 13. The central opening in the plate within the flange 21 facilitates the gripping and handling of the plate during attachment and removal. A suitable supporting device (not shown) may be placed within the housing 1 to hold the unit 7 during removal of the mounting devices 12, sufficient access for this purpose being afforded by removal of the top wall 3. After the plate 14 is in registry with the opening 13, it may be removed laterally from the housing and from the ring 17, which may then be removed. Since the ring 17 is resilient, it may be somewhat larger than the opening 13 but upon removal may easily be compressed to pass through the opening. It is thus apparent that the resilient mounting may readily be removed for replacement or adjustment without requiring access to the mounting from within the housing 1. The refrigerant connections between the motor-compressor unit 7 and the remaining parts of the refrigerating apparatus are made sufficiently flexible to insure minimum transmission of vibration through the conduits. For example, the discharge conduit indicated at 25 is formed as a loop of refrigerant tubing and the suction connection indicated at 26 is similarly formed. After the mounting devices 12 have been detached, and also the connections between the condenser 8 and the housing and between the liquid receiver 9 and the housing, the entire unit may be removed through the top of the housing, provided, of course, that the external refrigerant conduits (not shown) have been detached or are sufficiently flexible to permit the removal. These features form no part of my present invention and further description is considered unnecessary.

From the foregoing it is thus apparent that I have provided a resilient mounting device which makes it possible to arrange vibration producing apparatus, such as motor-compressor units, in close proximity to their supporting wall structures and in such manner that the mounting device may be detached entirely from the outside of the supporting structure without requiring access from within the structure.

Although I have illustrated and described a particular form of my invention as applied to a refrigerant condensing unit, other modifications will readily be apparent to those skilled in the art. I do not, therefore, desire my invention to

be limited to the particular construction illustrated and described and I intend by the appended claims to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An apparatus mounting comprising a supporting wall, a vibration producing device arranged adjacent said wall, said wall having an opening therein near said device, the opening having one portion of greater width than another portion thereof, and detachable resilient mounting means for securing said device to said wall, said means comprising a block of resilient material frictionally attached to said device and a plate frictionally engaging said block and extending across said other portion of said opening and detachably secured to said wall, the size and shape of said plate being such that when the plate is in a position of registry with said one portion of said opening it may be moved laterally through said opening whereby said plate may be removed outwardly from said wall after movement of said plate on said wall to its position of registry with said opening.

2. An apparatus mounting comprising a supporting wall, a vibration producing device arranged adjacent said wall, said wall having an opening therein near said device, the opening having one portion of greater width than another portion thereof, detachable resilient mounting means for securing said device to said wall, said means comprising a block of resilient material frictionally attached to said device and a plate frictionally engaging said block and extending across said other portion of said opening in engagement with said wall adjacent at least two sides of said opening, the size and shape of said plate being such that when the plate is in a position of registry with said one portion of said opening it may be moved laterally through said opening, said wall having depressions formed therein to accommodate and retain the engaged portions of said plate, said plate being pressed into said depressions by said resilient block, and detachable securing devices accessible from the outer side of said wall for locking said plate in position in said pockets, said plate being removable from the outer side of said wall upon release of said locking devices and lateral movement of said plate out of said depressions and along said wall into registry with said one portion of said opening.

3. An apparatus mounting comprising a supporting wall, a vibration producing device arranged adjacent said wall, said wall having an opening therein near said device, the opening having one portion of greater width than another portion thereof, and detachable resilient mounting means for securing said device to said wall, said means comprising an external flange member secured to said device and a plate detachably secured to said wall and having an inwardly extending flange member and a ring of resilient material engaging said members and rotatable with respect to at least one of said members, the size and shape of said plate being such that it may be rotated into a position of registry with said opening after it has been detached from said wall and may be moved laterally through said opening away from said wall.

4. An apparatus mounting comprising a supporting wall, a vibration producing device arranged adjacent said wall, said wall having an opening therein near said device, the opening

having one portion of greater width than another portion thereof, and detachable resilient mounting means for securing said device to said wall, said means comprising a block of resilient material frictionally attached to said device and a plate frictionally and rotatably engaging said block and extending across said other portion of said opening and detachably secured to said wall adjacent at least two sides of said opening, the shape of said plate being substantially the same as that of said opening but slightly smaller whereby said plate may be detached from said wall and rotated into a position of registry with said opening and may be moved laterally therethrough away from said wall, said wall having pockets formed therein to accommodate the engaging portions of said plate for facilitating the securing of said plate to said wall, said resilient block permitting movement of said plate out of said depressions for rotation into registry with said opening.

5. An apparatus mounting comprising a supporting wall, a vibration producing device arranged adjacent said wall, said wall having a triangular opening therein near said device and detachable resilient means for securing said device to said wall, said means comprising a block of resilient material frictionally attached to said device and a triangular plate frictionally and rotatably engaging said block and having its corners engaging the wall adjacent the sides of said opening, detachable securing devices accessible from the outer side of said wall for locking the corners of said plate to said wall, said plate being the same shape as said opening but slightly smaller whereby said plate may be detached from said wall and rotated into a position of registry with said opening and may be moved laterally therethrough away from said wall.

6. An apparatus mounting comprising a supporting wall, a vibration producing device arranged adjacent said wall, said wall having a substantially equilateral triangular opening therein near said device, detachable resilient mounting means for securing said device to said wall, said means comprising an external flange member secured to said device and a substantially

equilateral triangular plate engaging said wall adjacent the sides of said opening and having an inwardly extending flange member and a ring of resilient material engaging said members and rotatable with respect to at least one of said members, said wall having recesses adjacent the sides of said opening for accommodating the corners of said plate, and detachable securing means accessible from the outer side of said wall for rigidly securing the corners of said plate in said recesses, said plate being slightly smaller than said opening so that it may be rotated into a position of registry with said opening after it has been detached from said wall and may be moved laterally through said opening away from said wall.

7. In a refrigerant condensing apparatus, a housing having oppositely disposed openings in two walls thereof, a motor-compressor unit arranged in said housing between said openings, and a pair of detachable resilient mounting devices for securing said unit in spaced relation to the walls of said housing, said devices being arranged adjacent said openings, each of said devices comprising an external flange member secured to said unit and a plate detachably secured to the adjacent wall of said housing and having an inwardly extending flange member and a ring of resilient material engaging said members and rotatable with respect to at least one of said members, the size and shape of each of said plates being such that it may be rotated into a position of registry with the corresponding one of said openings after it has been detached from said housing and may be moved laterally through the opening from said housing.

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The following references are of record in the file of this patent:

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