

Oct. 28, 1947.

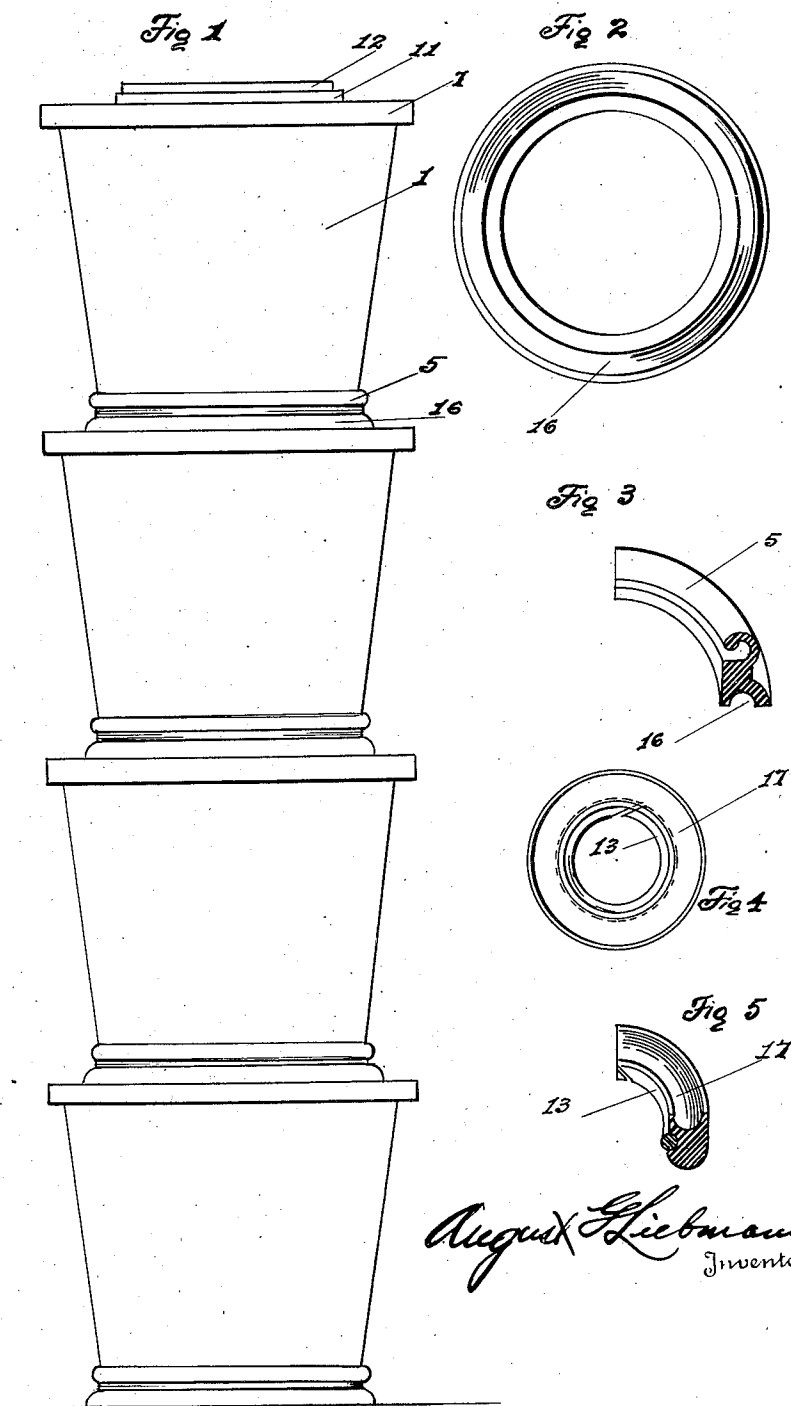
A. G. LIEBMANN

2,429,958

MEANS FACILITATING STACKING OF CONTAINERS

Filed Oct. 17, 1944

4 Sheets-Sheet 1



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Fig 6

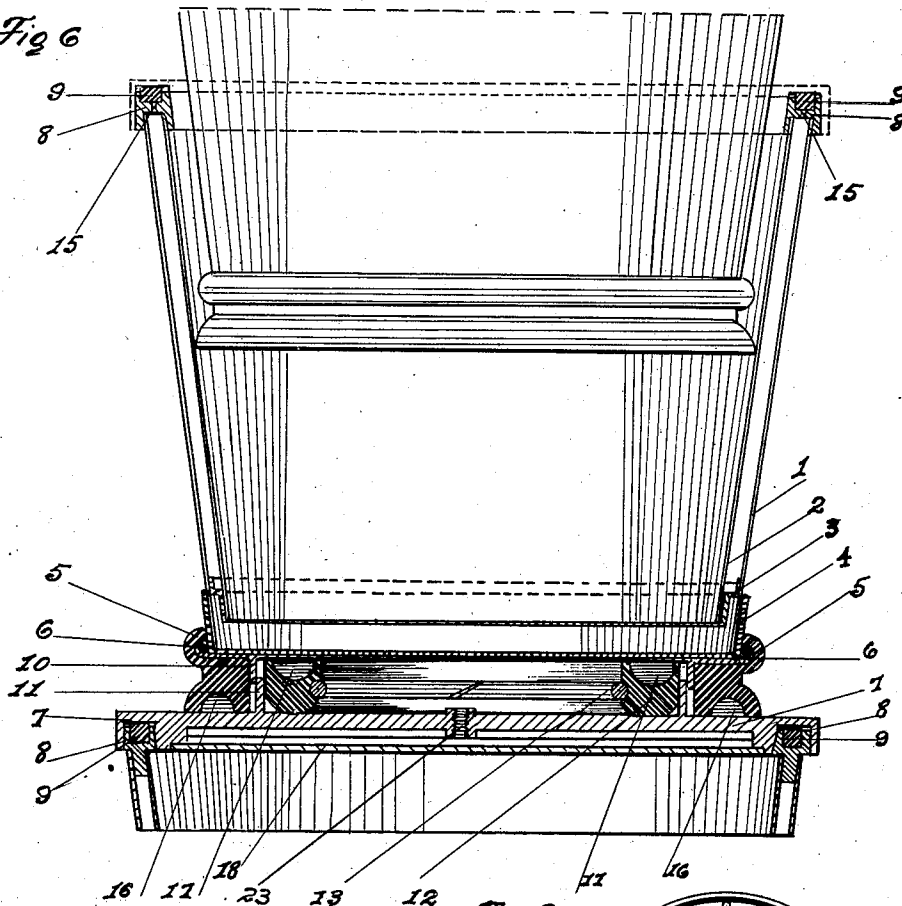


Fig 7

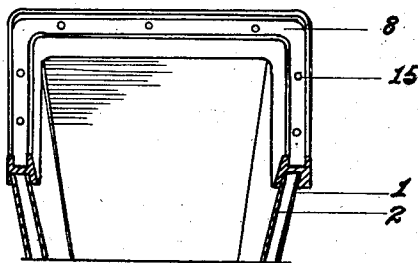
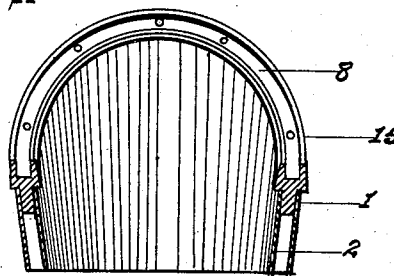


Fig 8



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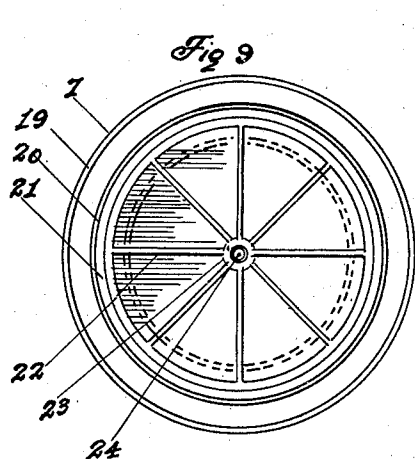


Fig 11

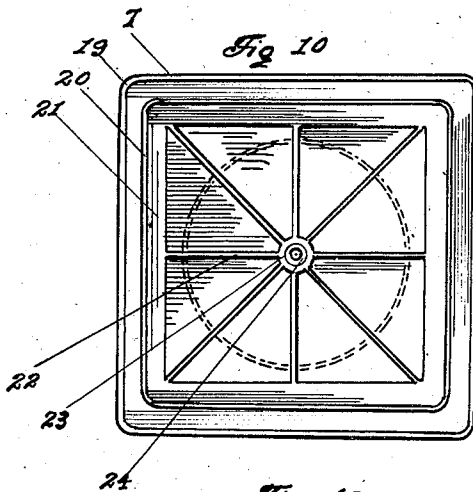


Fig 12

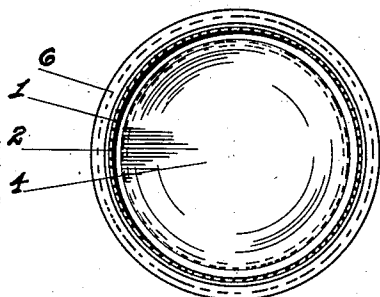


Fig 13

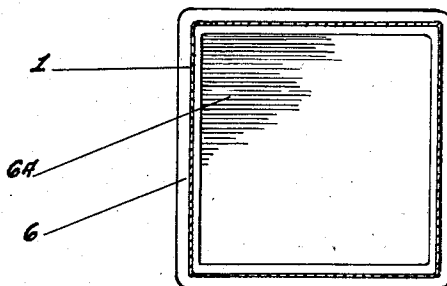
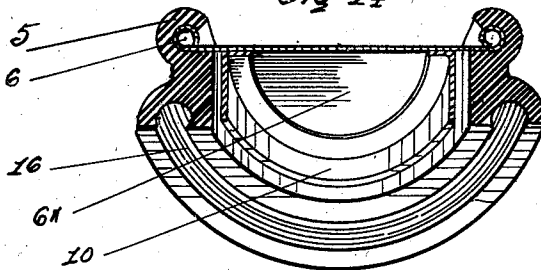
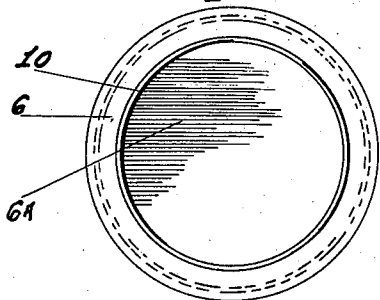


Fig 14



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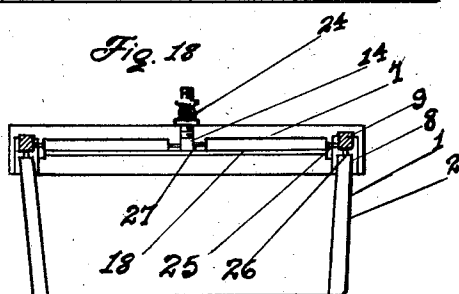
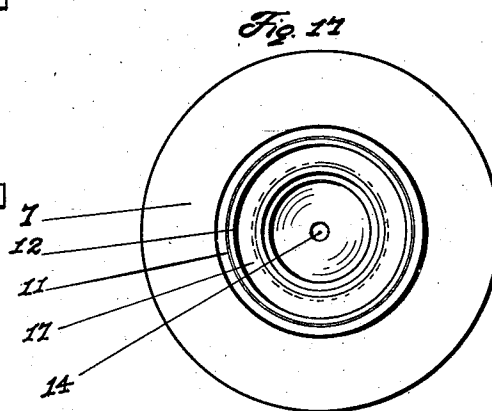
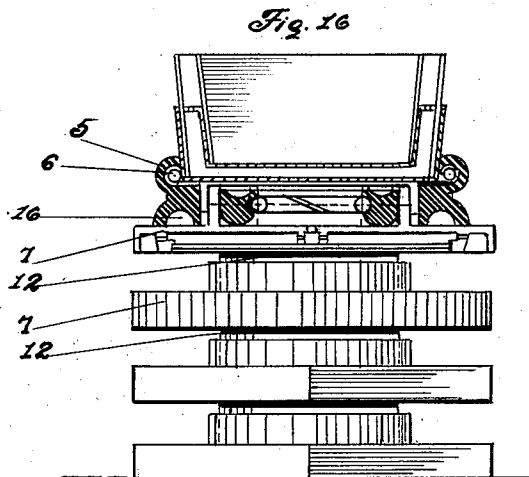
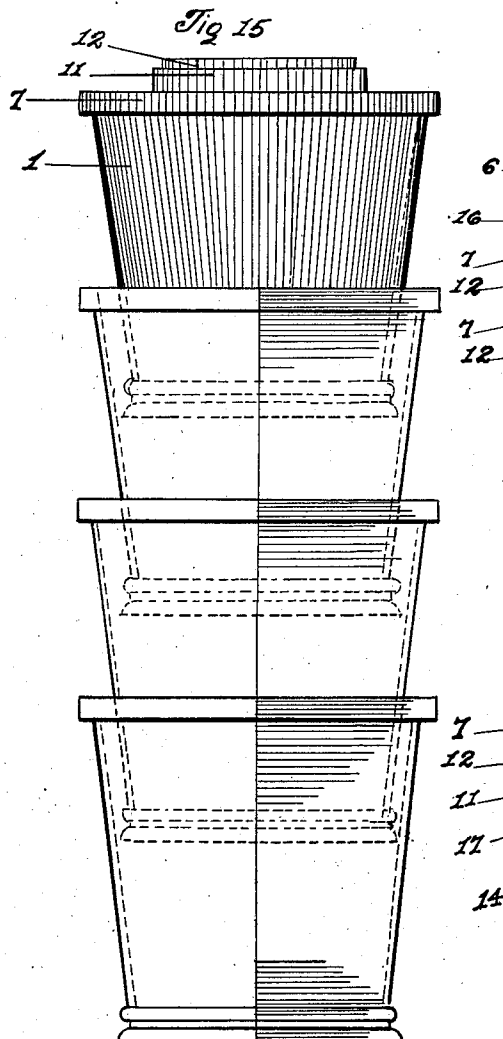
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MEANS FACILITATING STACKING OF
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3 Claims. (Cl. 220—97)

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The present invention pertains to facilities for handling air-cargo in air-commerce, such as a combined universal shipping container and freight packer for mass shipments of liquids or solids, in small containers or in bulk, the governing factors of which are controlled by the available cargo space in cubic measurement, coordinated with permissible floor loading, adaptability of packer to carry wet or dry products, with a minimum tare weight and a maximum of structural efficiency of the packer to allow stowage in tiers when loaded and nested together to save space when empty.

Many commodities having floor load weights ranging consecutively from 20 lbs. per cu. ft. to 70 lbs. per cu. foot, are of such quality and quantity as to warrant shipments by air-cargo.

This range of weights for example, from the lower weight such as tea, to the higher weight, such as dye extracts, with a numerous list of commodities of various weights between these extremes must be considered.

The minimum standard weight allowable for air-cargo space being six pounds of payload per cubic foot, up to a maximum of 240 lbs. per square foot of floor load, the last named factor is controlled by the capacity of feeder craft shuttling back and forth from remote zones of supply to the main line routes.

The standard height of piles or tiers of stowed freight is fixed at 72 inches above the floor of craft.

A matter of first and compelling importance is to prevent shifting of such stowed cargo in flight, and the means to prevent such shifting must be inherent in the packer.

With these controlling factors in mind, the present invention relates to shipping packers having a scope of universal utility adapted to handling air cargo, and more particularly to an improvement in methods of stowing and holding in tact loaded or empty returning containers in transit, with a maximum of interchangeable efficiency and economy in the handling of a wide range of traffic commodities.

This is accomplished by the improvements in cushion vibration insulators, for interlocking the packers stored or stowed aboard in tiers, when loaded, or features providing the knock-down and nested empties of containers, bodies and end closures that stay put, and held against shifting about in the cargo space of the craft.

As approximately 10% of the tare load of air-cargo is allocated to the exterior container case, even when made of light durable fibre, it is a

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total loss, but with the present invention, it is contemplated that this weight may now be used in providing a permanent universal shipping packer, which has the inherent stability to hold its place in the load, and so far as I am aware such facility has not been heretofore disclosed.

Thus to coordinate the factors of available cargo-space, floor loading of craft, interchangeability of wet or dry products, smaller packages, or bulk materials, minimum tare weight, maximum strength of packer, and the inherent stability to prevent the shifting of cargo, are the objects of the present invention.

A further aim of the invention is to construct such vibration insulator anchoring means in such manner as to permit hard use and wear in such manner as to not destroy the suction action of the cushion vibration insulators, and the concave channels therein, or the concavo-convex surfaces that afford the gripping facilities incidentally essential to stowage stability in transit in air-commerce.

Further objects and advantages will appear in the purposes hereinafter described.

In the accompanying drawings:

Figure 1 shows a series of universal shipping packers, in stowing position for cargo; the round containers adapted to tiers three high and the rectangular containers four high, by reason of the basal area and permissible area of floor loads of feeder craft, that shunts cargo from and on branch lines to main lines of air-ways.

Figure 2 is a bottom plan view of the suction area of the cushion vibration insulator, for circular packers.

Figure 3 is a segment of a cushion vibration insulator with the end of said segment shown in section, as in Fig. 2.

Figure 4 is a top plan view of a cushion vibration insulator with concave face or upper supporting surface, with expansible snap ring to hold it in place.

Figure 5 is a segment of a cushion vibration insulator with end of said segment shown in section, as in Fig. 4, the upper supporting face being concave and the lower attaching face convex, with a segment of the expansible snap ring as shown in Figure 4.

Figure 6 is a cross section of a universal shipping packer, taken on a line of its vertical axis, and superimposed upon the end closure of a similar container, and having a segment of another container placed inside it to show the relative nesting and knock-down advantages.

Figure 7 is a perspective of the square type

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packer or rectangular type, illustrating the side walls and the seal ring, fragmental and in section.

Figure 8 is a perspective, fragmental and in section to illustrate the circular seal ring and its position in respect to the side walls of the packer.

Figure 9 is the bottom plan view of end closure for the circular type of packer, with liner plate removed.

Figure 10 is the bottom plan view of an end closure for the rectangular type of opening of the packer, with the liner plate removed to expose the buttressing webs.

Figure 11 is a top plan view of the bottom of the container on the inside, with side wall in section, and showing the outer dished or drawn shell, to which is attached the foundation plate, having a turned edge to hold the clincher portion of the cushion vibration insulator as disclosed in Figure 14.

Figure 12 is substantially the same elements as Figure 11, but for containers or packers with rectangular bottoms.

Figure 13 is the bottom plan view of the foundation plate, showing the rolled over edge to hold the clincher portion of the cushion vibration insulator also shown in Figure 14.

Figure 14 is a bottom segmental plan view in perspective of the foundation plate, with rolled over edges to hold the cushion vibration insulator, the circular buttressing flange for the same and the cushion vibration insulator as applied to the base of the container or packer.

Figure 15 is a side elevation of the aspect of stowage facilities inherent in the construction of the packers, with rectangular shapes of bodies at bottom of the tier and circular shape nested therein at the top.

Figure 16 shows a stack of end closures, with a fragment of packer in section, stacked and held by means of the cushion vibration insulators.

Figure 17 is a top plan view of an end closure of the packer of circular opening type, showing the flange, the resilient concave suction ring with convex base, to permit flattening of the concavity of said suction ring, and the expansible metallic ring to secure the same in fixed position, with the exhaust valve orifice in the center of the end closure.

Figure 18 shows a fragment of a packer with end closure, in section through its vertical axis, with the intercommunicating air ducts for exhausting the air from the interstices between the walls of the sides, bottom and end closure, to hold closure locked by atmospheric action.

In the drawings, the numeral 1 indicates the outside vertical wall of a packer, and 2 the inner wall of the same, numeral 3 indicates the inside bottom dished wall, and 4 indicates the outside bottom dished wall, to which said dished member the side wall is secured.

The numeral 5 indicates the clincher portion of the cushion vibration insulator, embodying the present invention. The numeral 12 indicates a companion, cushion vibration insulator, also embodying the present invention.

The said cushion vibration insulators are as usual formed of rubber, and more especially the type known as vulcanizable hydrocarbon gums or synthetic rubber which is impervious to the action of oil and other substances. For all practical purposes in most cases of usage, however, the well known vegetable type of latex gum being equally effective, as, when and if obtainable.

The cushion vibration insulator, based on the

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theory of a cube in cross section, is molded with a channel in the face of the tread, and provided with an upstanding lug upon its upper surface, also provided with a channel serving as a clincher element to engage an annular bead abutment of the base of the container.

This lug, annular in form, with an annular channel therein, is adapted to grip the beaded abutment aforesaid.

The cushion vibration insulator, is provided with a smooth upper surface, of the theoretical cube in section, which surface serves to support the weight of the container and contents, while the lug serves to anchor the whole to the base of the container.

The outer surface of the cushion vibration insulator, is provided with a beveled side to facilitate the flexibility of the tread channel, and the inner surface having a perpendicular face, forming a right angle with the upper surface or supporting face of the container bottom.

Thus the upper supporting face of the cushion vibration insulator and the inner side wall, form with bottom of the same in theory, 3 walls of the cube, the outer wall being curvilinear to induce resiliency as well as the base provided with the channel therein for the same purpose.

The concavity of the tread portion of the cushion vibration insulators permits deformation by reason of weight imposed upon it, to expel the air trapped in said concavity and the end closure 7 and the foundation plate 6. The end closure is adapted to interfit with a sealing ring 8 which carries a resilient gasket 9 to effect an air tight packing joint, between the same.

This is accomplished by the exhaustion of trapped air from the interstices between the walls of the packer and the end closure; hereinafter more fully described, yet old in the prior art, such as securing end closures of containers by means of exterior pressure of the atmosphere upon the same.

The clincher portion 5 of the cushion vibration insulator interlocks with the rolled edge or bead on the foundation plate designated 6 and its buttress flange designated 10 which is adapted to interfit for vertical sliding movement with a corresponding flange 11 integral with the end closures 7. Within this annular flange, serving as an abutment upstanding upon said end closure, another cushion vibration insulator is disposed and designated 12, having an expansible locking ring 13 interfitting with a groove in the inner surface of the side wall of the said insulator, this expansible locking ring serving to secure the said insulator 12 in place within the said flange 11 by reason of its lateral compressive spring action upon the insulator of an annular form held concentrically within the annular abutment designated as flange 11.

This cushion vibration insulator designated by numeral 12 has a concave face, and a convex supporting face in contact with the upper surface of the end closure 7, to which it is attached as aforementioned.

In Figures 2, 3, 4 and 5 of the drawings, the details of construction of the cushion vibration insulators are respectively shown in plan and segmental form with cross sections thereof.

These cushion vibration insulators are of two different forms in cross-section, the insulator designated by the numeral 6, having a suction tread channel, and an upstanding lug, adapted to clinch and secure the same to a bead abutment by tension friction hold upon the base of

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the container, hereinafter known as the clincher insulator, and the insulator designated by the numeral 12, having a suction tread, and an annular expansible ring fitted to its inner surface, disposed within an annular upstanding flange on the upper surface of the closure of the container, hereinafter known as the spring insulator.

The clincher insulator 5 is attachable by its clincher section to the foundation plate 6, in turn fixed to the dish end of the packer 4 and having its interior concentric wall abutting against the flange 10; and the spring insulator 12 is attachable to the upper surface of the end closure 7 and secured by a locking expansible ring 13 against the abutment flange 11.

By reference to Figures 1, 6 and 16 of the drawings, it will be observed that the clincher insulator 5 carries contained weight and its tread surface rests upon the end closure 7 and that the spring insulator 12 fixed to the end closure supports the bottom of such structure holding contained weight as may be superimposed upon it.

It has before been stated that a suction force is exerted due to the concave surfaces of both insulators and it will be noted that as the insulators are so held as to permit the compression of their concave tread surfaces, hence a partial vacuum is established when pressure is exerted upon them. It will now be seen that, when the cushion vibration insulators are subjected to pressure, each of the areas designated by numerals 16 and 17 as suction areas will be somewhat flattened and a partial vacuum created in these areas. The formation of such suction areas, are spread due to the pressure exerted and, yet the cushion vibration insulators are not dislodged from their abutment flanges 10 and 11 which interfit for vertical sliding movement, to thus compensate for such dependent compression and stability of equalization of the loading imposed upon them.

The inner surface of the end closure 7 is provided with a liner plate 18 secured air tight to the rabbeted edges on the inside of the said end closure. The plate 18 is supported at its center by the boss 23, Figure 6, and the flanges 19 and 20 of the end closure 7 are adapted to interfit with the seal ring 8 of the packer.

In Figures 9 and 10 these elements are shown with the liner plate removed to disclose the buttress webs of the top surface of the end closure 7, the buttress webs designated by numeral 22 and the boss by numeral 23.

Interfitting with said boss 23, is an exhaust valve 24 to withdraw the air from the interstices between the walls of the packer and its end closure as shown in Figure 18 by means of ducts or passages 25, 26 and 27 which places the intersticed passages in intercommunicative relationship.

This type of packer is adapted to be constructed of aluminum alloy or other light weight suitable materials, the elements designated by numerals 8 or seal rings as shown in Figures 8 and 9, to be from fabrication of extruded shapes, or preferably from die castings; and the elements or end closures 7 in Figures 9 and 10 also from die castings.

The liner plate 18 and the side walls designated 1 and 2 and the dish bottom ends 3 and 4 form suitable sheet materials.

Having thus described the invention, what I claim is:

1. A general shipping container of the knock-down, nesting type; having a body portion with

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a base portion and an end closure; cushion vibration insulating rings mounted upon the periphery of the base portion and the outer face of the end closure; the said insulating rings being of resilient material and having their tread faces provided with annular channels, forming suction areas; flange members mounted upon and secured to said base portion and end closure; the flange on the cover contacting the outer periphery of the ring on the cover and the flange on the base portion contacting the inner periphery of the ring on the base portion; the flange on the cover, in operative position, lying within the flange on the base portion of a superposed container and in sliding engagement therewith; and the said flanges being less in height than their respective contacting resilient rings; whereby the cover is held in interlocking engagement with base of a superposed container.

2. A general shipping container of the knock-down nesting type, having a body portion with a base portion and an end closure; cushion vibration insulating rings of non-metallic resilient material comprising substantially annular rings disposed upon and secured to the base portion of the body portion and upon the outer face of the end closure; the said cushion vibrating insulating rings having outwardly facing concave annular channels, comprising tread faces; the tread faces forming suction areas when placed in contact with plane surfaces; the outer peripheral dimension of the cover ring being less than the inner peripheral dimension of the ring on the base portion, whereby when one container is superposed on the cover of the other container, the ring on the cover will lie within the ring of the base of the superposed container and operate to interlock the cover of one container with the base of a superposed container.

3. In a general shipping container, of the knock-down nesting type, having plural walls; a body portion and a bottom end portion, the body portion of an inverted frustro-pyramidal form with a substantially rectangular base; a foundation plate secured to the bottom end portion; an annular lug on the periphery of the foundation plate; a cushion vibration insulating ring, having a clincher portion of convex-concavo form adapted to grip the annular lug of the foundation plate; an annular reenforcing boss secured to the outer face of the foundation plate inwardly of said lug adapted to buttress the inner wall of the cushion vibrating insulating ring; an annular channel in the outer face of said cushion vibrating insulating ring, comprising a basal tread having a suction area for interlocking the said tread face upon a plane contact surface.

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