April 26, 1955 M. H. THOMPSON ET AL 2,706,895

PORTABLE COOLER

Filed June 16, 1954 3 Sheets-Sheet 1

FIG. 1.

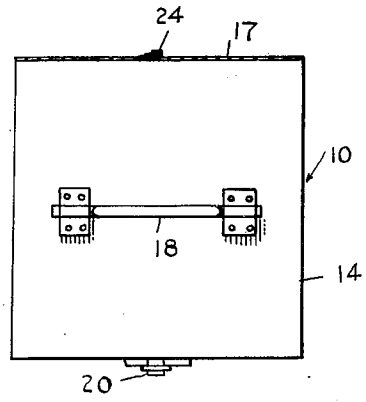


FIG. 2.

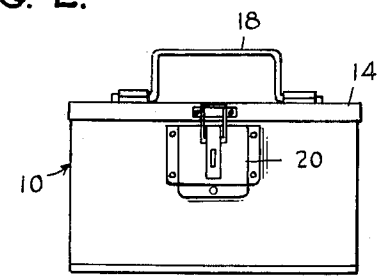
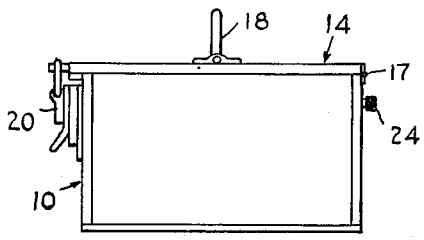


FIG. 3.



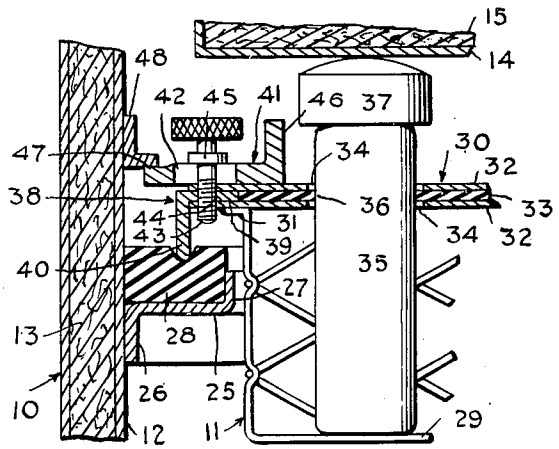


FIG. 8.

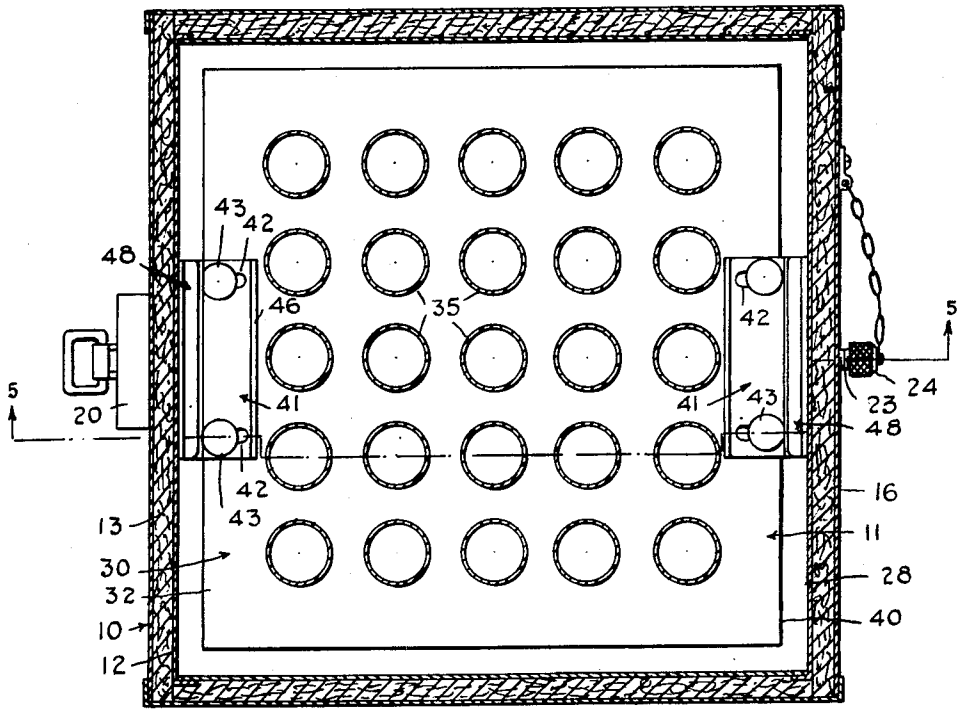
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April 26, 1955 M. H. THOMPSON ET AL 2,706,895

PORTABLE COOLER

Filed June 16, 1954 3 Sheets-Sheet 2

FIG. 4.



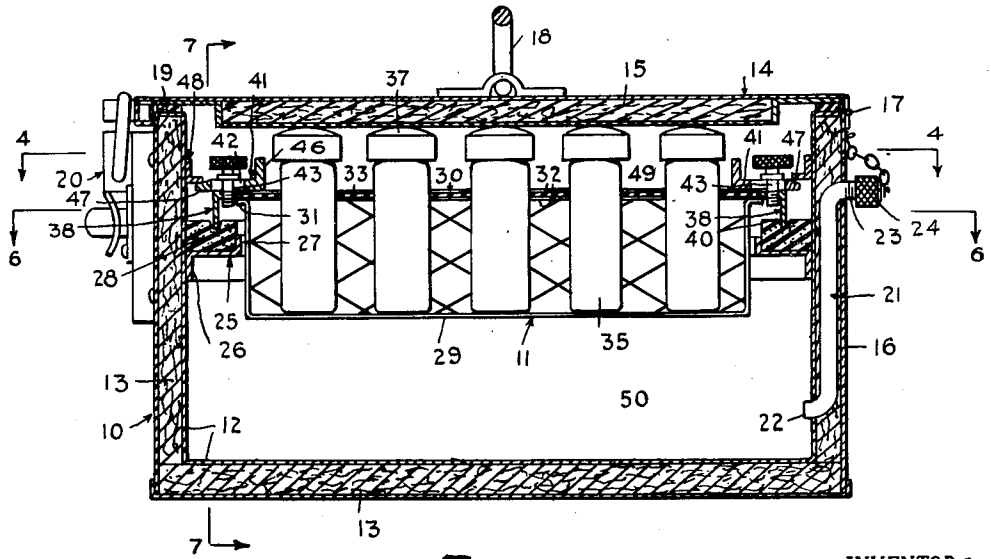


FIG. 5.

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April 26, 1955 M. H. THOMPSON ET AL 2,706,895

PORTABLE COOLER

Filed June 16, 1954 3 Sheets-Sheet 3

FIG. 6.

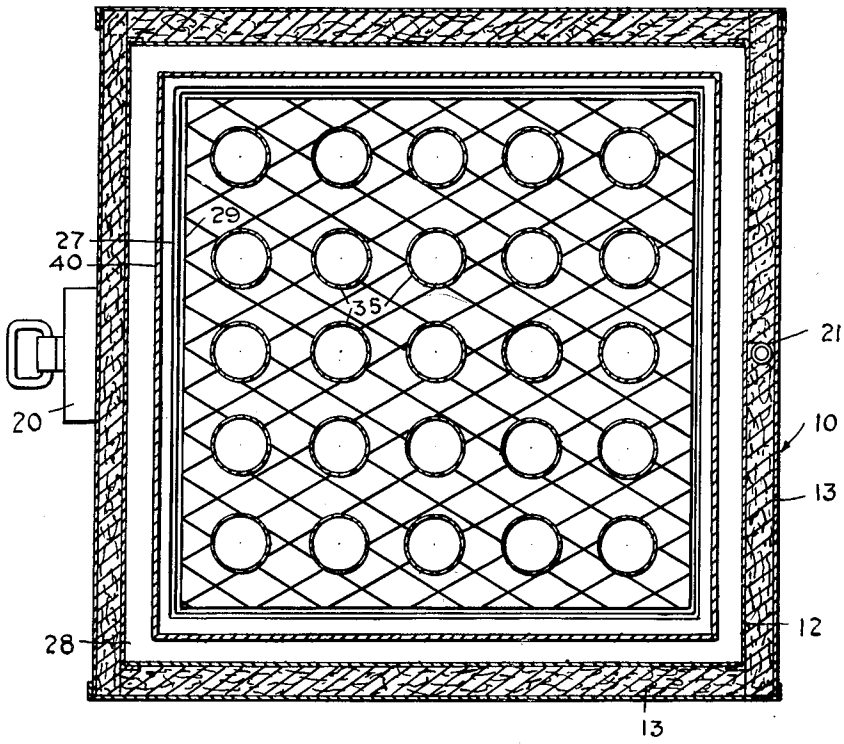
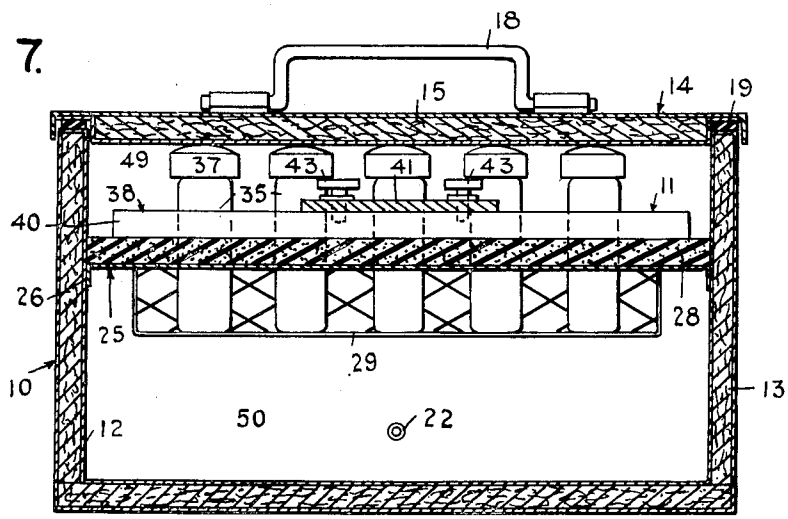


FIG. 7.



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2,706,895

PORTABLE COOLER

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Application June 16, 1954, Serial No. 437,132

10 Claims. (Cl. 62—76)

Our invention relates to a portable cooler for laboratory bottles and the like, although not limited to this purpose.

A primary object of the invention is to provide a cooler for bottles or vials which must be immediately cooled after collection and remain adequately cooled until delivery to a laboratory for storage in the laboratory refrigeratory.

Another object is to provide a device of the above-mentioned character embodying a bodily removable unit which may be lifted with a plurality of vials from the insulated container for storage in a laboratory refrigerator, or the like.

A further object is to provide in a cooler of the above-mentioned character, novel means for sealing the tops of the vials from contact with the ice water or the like in the insulated container, in which the lower portions of the vials are submerged for cooling.

Another object is to provide novel and simplified means for releasably securing the removable unit in place within the container, so that it will not move relative to the container, and also maintaining the removable unit in sealing engagement with a gasket of the container.

A still further object of the invention is to provide means for maintaining a constant level of the cooling liquid within the container and preventing spilling of the coolant during transportation of the device.

Further objects are to provide a portable cooler of the above mentioned character which is simplified and durable in construction, reliable and efficient in operation, and relatively inexpensive to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a plan view of the cooler,

Figure 2 is a side elevation of the same,

Figure 3 is an end elevation of the cooler,

Figure 4 is a horizontal cross section taken on line 4—4 of Figure 5,

Figure 5 is a vertical section taken on line 5—5 of Figure 4,

Figure 6 is a horizontal section taken on line 6—6 of Figure 5,

Figure 7 is a vertical section taken on line 7—7 of Figure 5, and,

Figure 8 is an enlarged fragmentary vertical section through the top wall of a removable tray unit and locking device therefor.

In the drawings, where for the purpose of illustration is shown a preferred embodiment of our invention, the numerals **10** and **11** designate generally an insulated container or box forming the body portion of the cooler, and a removable and replaceable tray unit for vials and the like, respectively.

The container or box **10** is preferably rectangular, as shown, and formed of metal, plastic material, wood or other suitable material. The container or box **10** is of double walled construction throughout, as shown in the drawings, and the inner wall **12** is treated so as to be rust resistant and completely waterproof. A filler or core **13** of thermally insulating material fills the space between the inner and outer walls of the box **10** so that the box has good heat insulating properties.

The open top of the box **10** is provided with a cover or lid **14** of double walled construction, as shown, and the space between the walls of the lid is also filled with thermally insulating material **15**, as shown. The lid **14** is hingedly secured to one vertical side wall **16** of the box by a suitable hinge **17**, as shown in the drawings, and the lid is swingable vertically for opening and closing the same. The lid **14** is preferably provided with a suitable carrying handle **18** for the cooler. A compressible gasket **19** of rubber or the like is preferably interposed between the marginal portion of the lid **14** and the tops of the vertical walls of the box **10**. The box **10** is further provided upon one vertical wall with a suitable latch **20**, rigidly secured thereto, and adapted to releasably secure the lid **14** in the closed position, as shown in the drawings.

A vertical overflow tube or pipe **21** is secured between the inner and outer walls of the vertical side **16** of the box **10**, and the lower end of this tube opens into the interior of the box near and above its bottom, as shown at **22**. The overflow tube **21** has a horizontal screw threaded extension **23** opening through the outer wall of the box side **16** near and below the top of the box, Figure 5, and this extension **23** carries a removable screw-threaded closure cap **24**, as shown. The overflow tube **21** is provided to aid in maintaining a constant level for the liquid coolant in the box **10**, and to prevent the liquid coolant from spilling or overflowing from the box during transit.

The box or container **100** is provided near and above its vertical center with a continuous horizontal rectangular frame or channel **25**, extending about the four vertical sides of the box and projecting inwardly of the sides for a substantial distance, as shown. The channel **25** has an outer depending flange or skirt **26**, suitably rigidly secured to the inner faces of the box sides, and the channel is provided at its inner side with a short upstanding vertical flange **27**. The horizontal channel **25** is entirely open inwardly of the flange **27**. A continuous thick compressible gasket or seal **28** of rubber, synthetic rubber or like material is seated upon the horizontal rectangular channel **25** and supported thereby, and this gasket extends entirely about the four sides of the channel and box, as shown.

The removable unit **11** comprises a relatively deep rectangular foraminous basket or tray **29** of stiff open mesh wire, or the like, adapted for suspension inside of the rectangular channel **25**, and arranged substantially centrally of the insulated box **10**, as shown. The basket or tray **29** has a horizontal cover **30** permanently rigidly secured to its top marginal flange **31** by welding, or by other suitable means. The cover **30**, as best shown in Figure 8, comprises a pair of spaced superposed plates **32** of sheet metal or the like, having arranged therebetween and fixedly secured thereto a relatively thick layer or sheet **33** of compressible material, such as rubber, synthetic rubber, or a suitable composition material. The cover **30** is provided with a plurality of uniformly spaced rows of uniformly spaced circular openings **34**, for receiving a plurality of specimen vials or bottles **35**, which are circular in cross section. The openings **34** are formed through the superposed plates **32** of the cover **30**, and are large enough to provide some clearance between them and the vials **35**, as best shown in Figure 8. Corresponding openings **36** in the compressible layer or sheet **33** are somewhat smaller than the openings **34**, so that the vials **35** may be snugly engaged by the openings **36** of the sheet **33** for forming liquid tight seals between the vials and the cover **30**. As shown in the drawings, the vials **35** or bottles have their major portions extending below the cover **30** and into the basket **29**, and the bottoms of the vials rest upon the bottom of the foraminous basket. The tops of the vials **35** project somewhere above the cover **30**, as shown, and the vials may be provided with removable covers **37**, the tops of which may contact the lid **14**, when this lid is closed. This arrangement assists in holding the vials in place during transportation, and preventing accidental loosening of the vial covers **37**, which might result in the spilling of their contents.

Means are provided on the removable tray unit **11** to releasably lock or clamp the same within the insulated box **10** in liquid tight or sealing engagement with the gasket **28**. Such means comprises a continuous horizontal rectangular frame or angle bar **38**, L-shaped in cross section, and including a horizontal portion **39** and a de-

pending vertical portion 40, integral therewith. The horizontal portion 39 of the frame 38 is disposed between the marginal portions of the plates 32, outwardly of the marginal edge of the compressible layer or sheet 33, Figures 5 and 8. The horizontal portion 39 is rigidly secured between the plates 32 by welding, riveting, or the like. The L-shaped rectangular frame 38 thus constitutes an integral part of the cover 30, and extends continuously about the four sides of the same, outwardly of the vertical side walls of the basket 29, in overhanging or superposed relation to the channel 25 and gasket 28. The vertical flange 40 of the frame 38 is adapted to have its lower edge bear against the top of the gasket 28 and compress the gasket near the transverse center of the gasket for forming a liquid tight seal therewith around all four sides of the basket 29, which is suspended inside of the channel 25, as stated. The gasket 28 and channel 25 thus bear the weight of the removable tray unit 11.

A pair of adjustable clamps or slides 41 are provided upon opposite sides of the cover 30 above the L-shaped frame 38. These slides 41 are provided near their opposite ends with slots 42, receiving vertical adjusting screws 43, having large narrow heads, as shown. The screws 43 are slidable with respect to the slots 42, and have screw threaded engagement within screw-threaded openings 44 formed through the marginal portions of the plates 32 and the horizontal portion 39 of the frame 38, Figure 8. The screws 43 may be provided near and below their heads with stop collars or shoulders 45, preferably formed integral therewith, for engagement with the tops of the slides 41. When the screws 43 are loosened somewhat, the slides 41 may be shifted laterally toward and from the vertical sides of the box 10, and when the screws 43 are tightened, the slides 41 are securely clamped against the horizontal cover 30 in the selected adjusted positions. The slides 41 are provided at their inner sides with upstanding vertical flanges 46, serving as handles to adjust the slides, and for lifting the removable unit 11 from the insulated box 10.

The slides 41 have their upper sides beveled or inclined adjacent to their outer edges, as indicated at 47, for wedging engagement beneath fixed L-shaped brackets or stops 48, which are rigidly secured to the inner faces of the adjacent vertical walls of the box 10, near and above the cover 30. The brackets 48 are preferably of the same lengths as the slides 41, Figure 4, and the slides 41 and brackets 48 are horizontally disposed. When the frame 38 is resting upon the gasket 28, the slides 41 are adjusted outwardly so that their beveled faces 47 wedge beneath the fixed brackets or stops 48. This forces the vertical flange 40 into the top of the compressible gasket 28, for forming a liquid tight seal between the gasket and the flange 40. The screws 43 are tightened for securing the slides 41 in wedging engagement with the brackets 48.

Liquid tight seals are now formed by the compressible layer 33 around each vial 35, and a liquid tight seal is also formed by the gasket 28 and vertical flange 40 around the four sides of the basket 29 and associated elements. The arrangement divides the insulated box 10 into upper dry and lower wet compartments 49 and 50, and the liquid coolant in the wet compartment 50 cannot enter the upward dry compartment 49, which is above the cover 30.

In use, cracked ice or the like is introduced into the lower compartment 50 of the box 10 when the lid 14 is open, and the tray unit 11 is removed. Water is added until the water level reaches the bottom of the channel 25. The unit 11 full of the vials 35 containing specimens of milk, food, blood, plasma or the like is slowly lowered into the box 10 while the cap 24 is removed from the overflow tube 21. As the tray unit 11 is slowly submerged in the ice water within the box 10, the water level rises within the box and excess water will overflow through the tube 21 until the water level reaches the bottom side of the cover 30, which is adjacent to the overflow extension 23. The cap 24 is now replaced for covering the overflow tube 21. The slides 41 are now shifted outwardly into wedging engagement beneath the stops 48, and the seal is formed with the gasket 28. The lid 14 is now closed and latched in the closed position by the latch 20, and the lid will engage the covers 37 of the vials to hold them in place. The vials 35 will be immediately cooled by the ice water, and the device may be carried or transported to the laboratory

without fear of spilling the contents of the vials or loosening of their covers 37.

The seals around the vials 35, formed by the layer or sheet 33, and the seal afforded by the gasket 28 assures that none of the ice water can enter the dry compartment 49 and wet or contaminate the upper portions of the vials or their covers. This is a very important feature of the invention, since we contemplate using the same for cooling and transporting samples of blood and the like which are readily subject to contamination.

In the laboratory, the lid 41 is opened and the tray unit 11 may be bodily lifted from the insulated box 10 after loosening of the screws 43 and shifting of the slides 41 inwardly from engagement with the stops 48. The entire unit 11 may be placed in the laboratory refrigerator until the specimens contained in the vials can be examined, or the individual vials may be removed and placed directly upon the laboratory table for immediate inspection and testing. An individual vial can be removed, a sample placed in it, and the vial replaced in the tray unit 11 and immediately submerged in the ice water for rapid cooling and storage. When the tray unit filled with vials is removed for storage in the laboratory refrigerator, another empty tray unit may be placed in the box 10 and is immediately ready for use.

The above illustrates some ways in which the cooler may be used, but various other uses of the device other than in connection with laboratory samples are obviously feasible. The device may be used for cooling any desired substance in the bottles or vials 35, and the individual vials or any number of them may be removed and replaced as desired, or the entire tray unit 11 may be replaced or removed as desired.

Instead of the mixture of ice and water in the compartment 50, we may also employ a suitable brine solution of ice and water for producing lower temperatures within the insulated box 10, and if preferred, dry ice or the like may be placed in the compartment 50.

It is to be understood that the form of our invention, herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

Having thus described our invention, we claim:

1. A portable cooler for laboratory samples and the like comprising an insulated container adapted to hold a liquid coolant, a tray unit for supporting laboratory samples within said container and adapted to be partially submerged in the liquid coolant, a first seal forming element carried by the side wall of the container and projecting inwardly thereof and extending marginally about the container, a companion seal forming element carried by the tray unit and extending marginally thereabout in opposition to said first element and engageable with the first element for forming a liquid tight seal therewith, and adjustable means connected with the tray unit and container for forcing said first and companion seal forming elements into liquid sealing engagement.

2. A portable cooler comprising a thermally insulated container adapted to hold a liquid coolant, a compressible gasket mounted upon the container and extending continuously about the inner sides of the same and spaced above the bottom of the container, a tray unit removably mounted within the container and adapted to hold vials or the like for immersion within the liquid coolant of the container, a flange carried by the tray unit and extending about the margin of the same for engagement with said gasket, and adjustable means carried by the tray unit and engageable with a part of the container for forcing the flange into liquid tight sealing engagement with the gasket.

3. A portable cooler comprising a thermally insulated container adapted to hold a liquid coolant, a gasket secured to the side walls of the container upon the inner side of the container and spaced from the bottom of the container, a tray unit removably mounted within the container and having a marginal part to rest upon the gasket and be supported thereby, a cover for the tray unit having opening means to receive vials or the like carried by the tray unit, said opening means forming liquid tight seals with the vials, and adjustable means associated with the tray unit for shifting the marginal part into liquid tight engagement with the gasket.

4. A portable cooler comprising an insulated casing,

a gasket mounted within the casing above the bottom of the casing and extending about the side walls of the casing, a foraminous container removably mounted within the casing inwardly of the gasket and having a marginal part to rest upon the gasket and form a liquid tight seal therewith, a cover for the foraminous container and having opening means to receive vials or the like held within the container, the opening means forming liquid tight seals with the vials, adjustable means associated with the container for forcing said marginal part into sealing engagement with the gasket, and overflow means associated with the casing to maintain the level of the liquid coolant within the casing near the cover of the container, said liquid tight seals afforded by the opening means and gasket preventing the liquid coolant from passing above the cover of the foraminous container, whereby the tops of the vials are protected from contamination.

5. A portable cooler comprising a thermally insulated casing, a gasket carried by the side walls of the casing above the bottom of the casing and within the casing, a foraminous container removably mounted within the casing and having a marginal part engaging said gasket to form a liquid tight seal therewith, a cover for the foraminous container including a compressible element having openings to receive vials or the like and to form liquid tight seals with the vials, the vials extending above and below the cover of the container, slides mounted upon the cover of the container and having cam parts, and stops secured to sides of the casing near the slides and engageable by the cam parts for forcing said marginal part against said gasket.

6. A portable cooler comprising a thermally insulated casing, a compressible element carried by the side wall of the casing within the casing and above the bottom of the casing, a container removably mounted within the casing and having a marginal part to engage the compressible element and form a liquid tight seal therewith, a cover for the container including a resilient layer having openings to receive vials or the like and to form liquid tight seals about the vials, slides carried by the container and connected with said casing and adjustable to force the marginal part of the container into liquid tight engagement with said compressible element, and a lid for the casing engaging the tops of the vials when closed.

7. A portable cooler according to claim 6, and overflow means for the casing to facilitate maintaining the level of a liquid coolant in the casing substantially at the elevation of the cover for the container.

8. A portable cooler comprising a thermally insulated casing having a lid, a channel member mounted within the casing and secured to the side wall of the casing above the bottom of the casing and extending entirely about the casing, a compressible gasket mounted within the channel, a foraminous basket removably mounted within the casing inwardly of the channel and extending above and below the channel and gasket, a cover for the foraminous basket, said cover including a pair of superposed plates and a compressible sheet arranged between the plates, the plates and sheet of said cover having a plurality of openings formed therethrough, the openings of said sheet being smaller than the openings of said plates, a depending marginal flange secured to the cover and resting upon the top of said gasket, a pair of stops secured to sides of the casing above the cover of the foraminous basket, slides carried by the cover of the foraminous basket and having inclined parts for engagement beneath the stops, and adjustable means for clamping said slides in selected adjusted positions with respect to said stops.

9. A portable cooler according to claim 8, and an overflow pipe connected with a side of the casing and having an outlet near the elevation of said cover.

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