Dec. 31, 1968 D. J. ASENBAUER 3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

Filed Oct. 23, 1965 Sheet 1 of 6

FIG. 1.

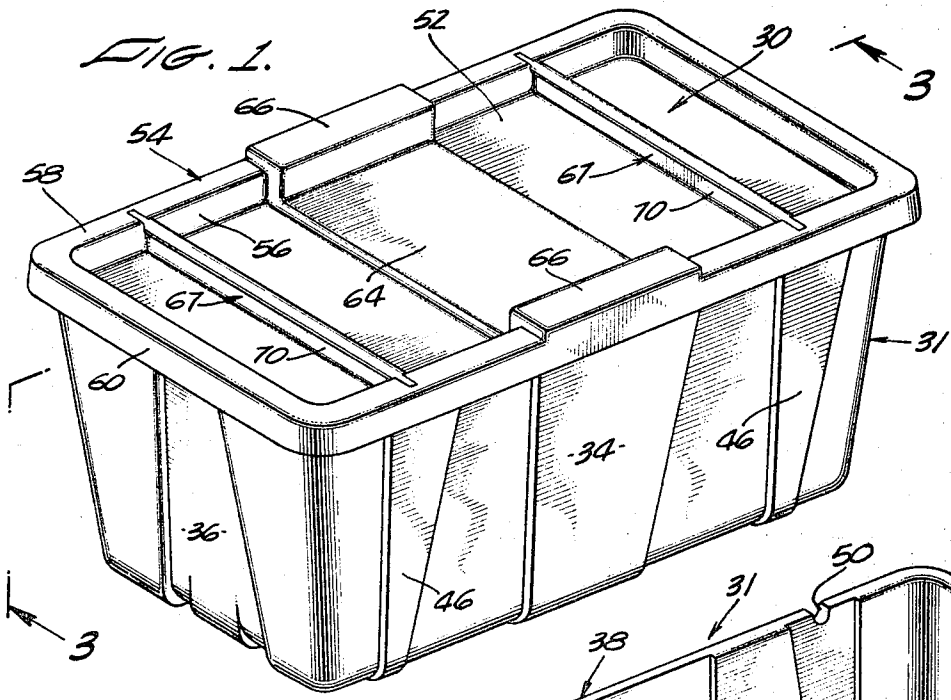


FIG. 2.

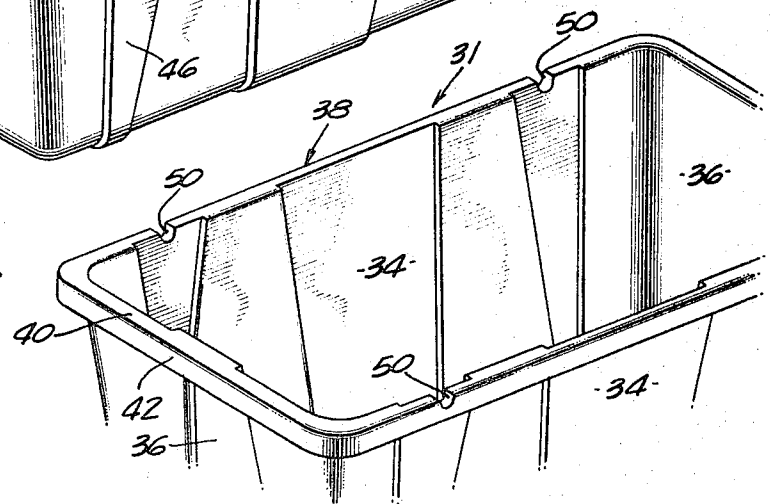
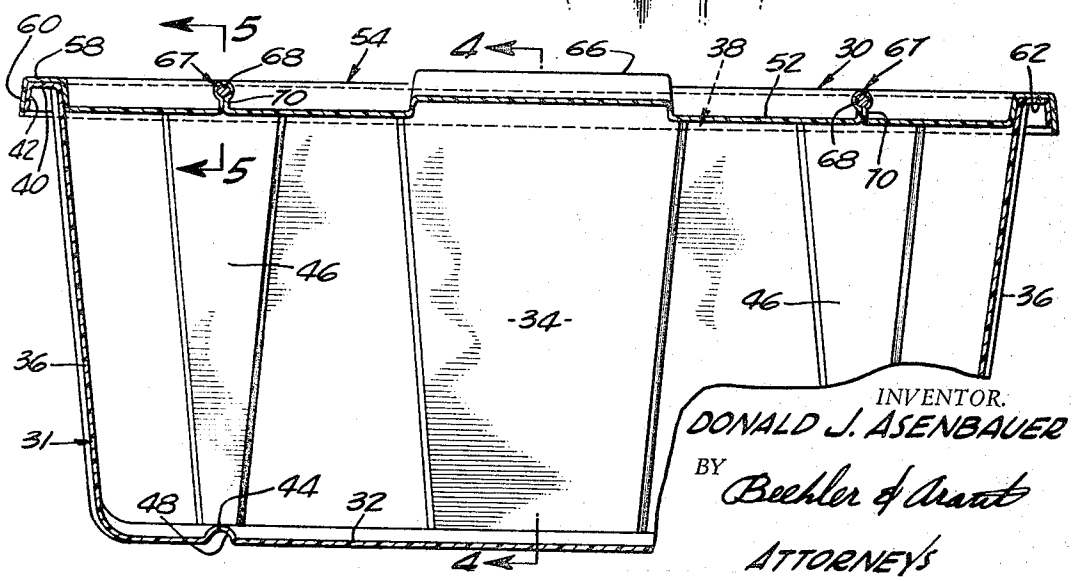


FIG. 3.



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Dec. 31, 1968 D. J. ASENBAUER 3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

Filed Oct. 23, 1965 Sheet 2 of 6

FIG. 4.

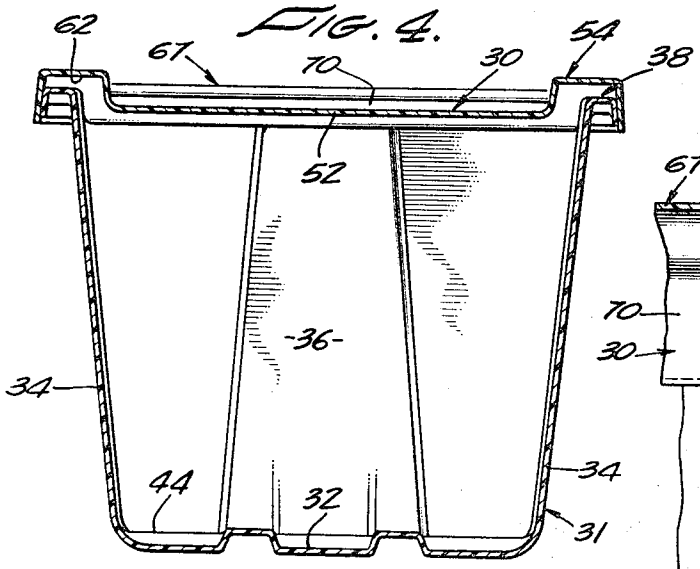
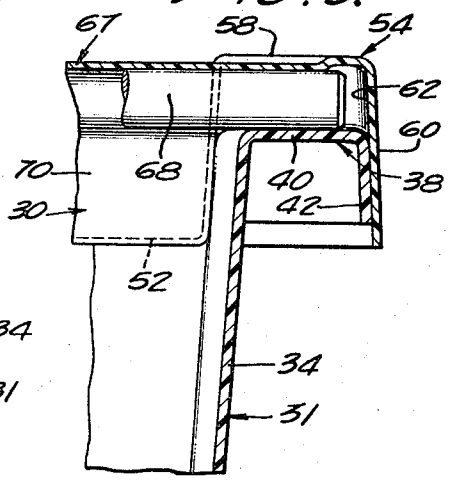


FIG. 5.



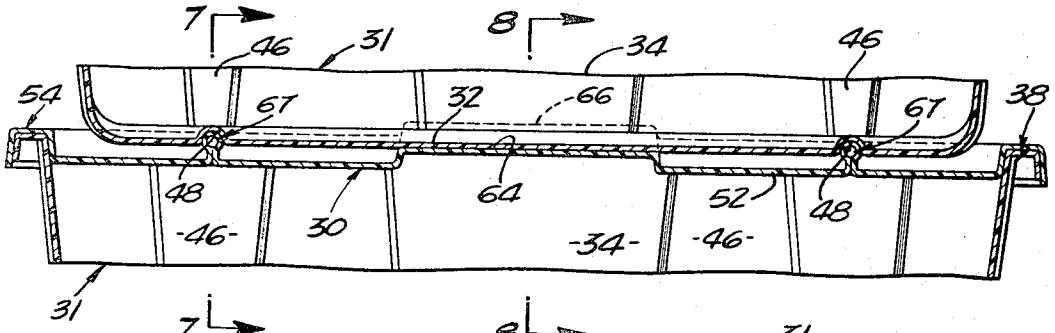


FIG. 6.

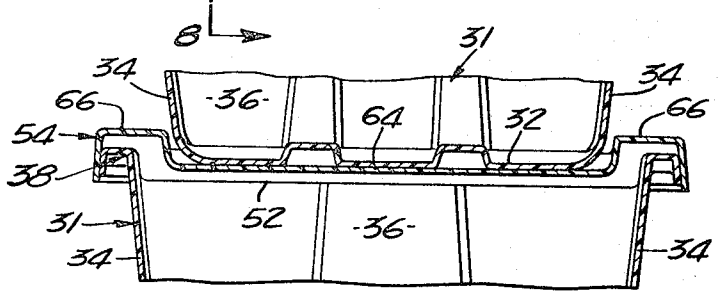


FIG. 8.

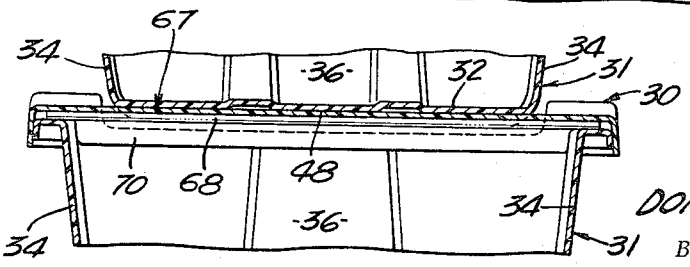


FIG. 7.

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Dec. 31, 1968 D. J. ASENBAUER 3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

Filed Oct. 23, 1965 Sheet 3 of 6

FIG. 9.

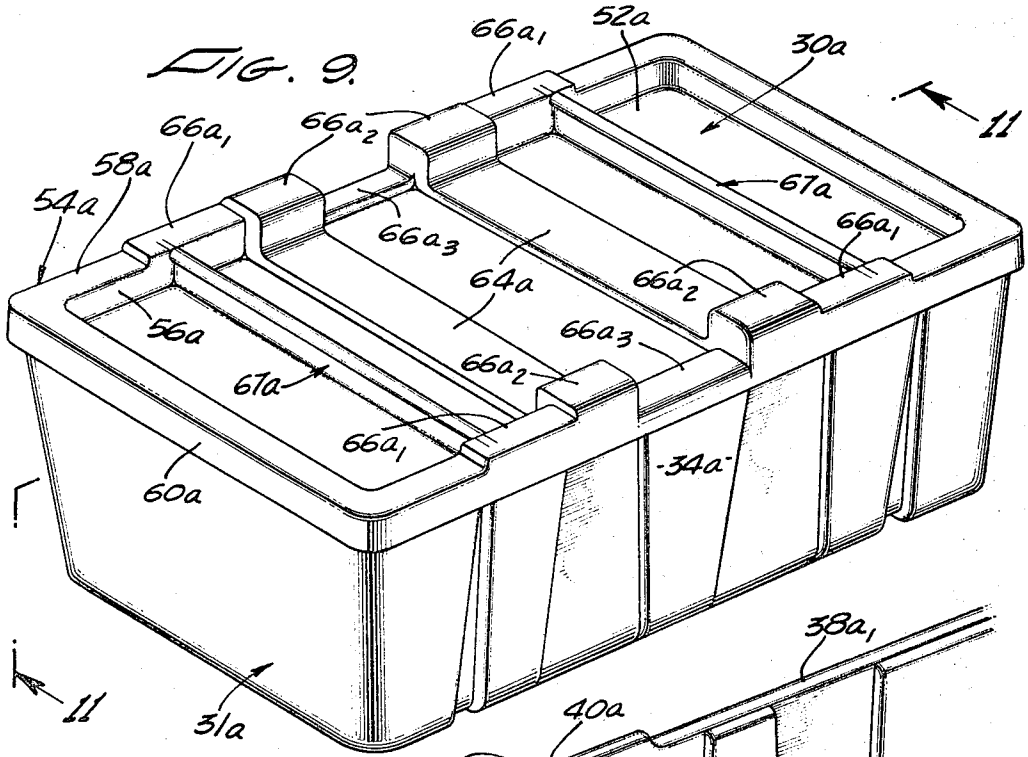


FIG. 10.

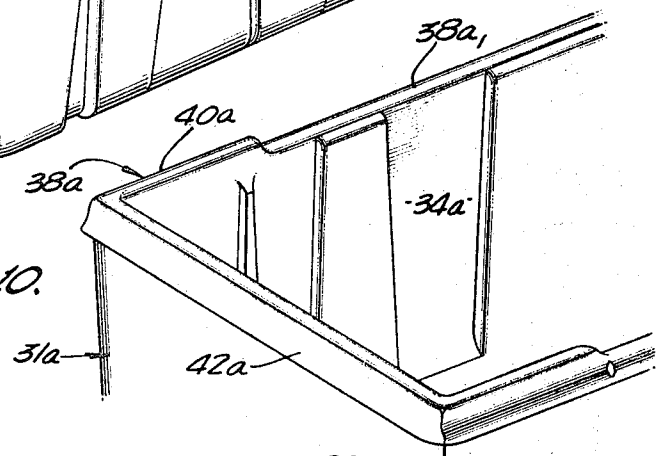
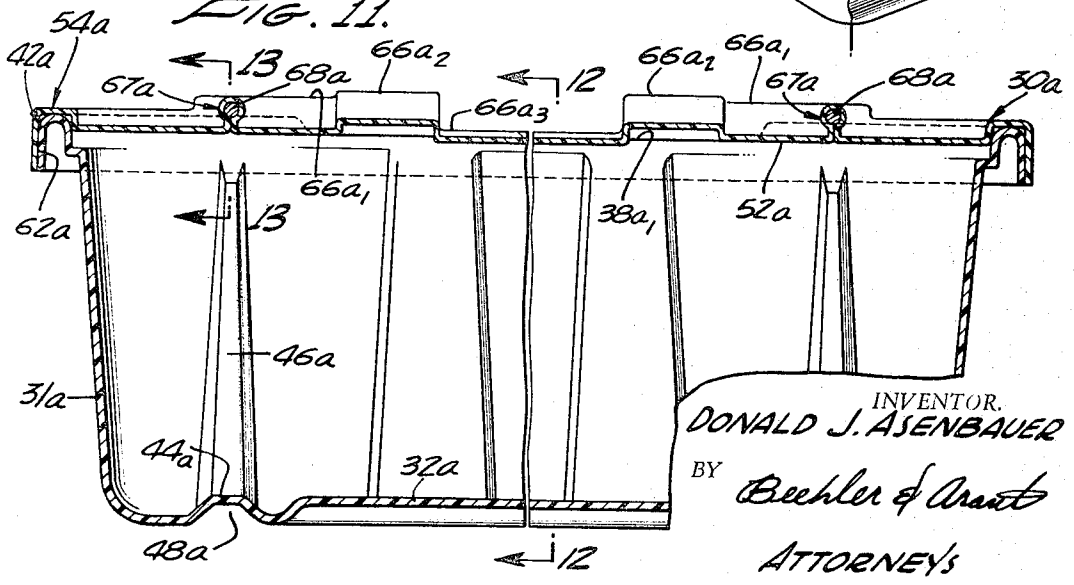


FIG. 11.



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Dec. 31, 1968 D. J. ASENBAUER 3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

Filed Oct. 23, 1965 Sheet 4 of 6

FIG. 12.

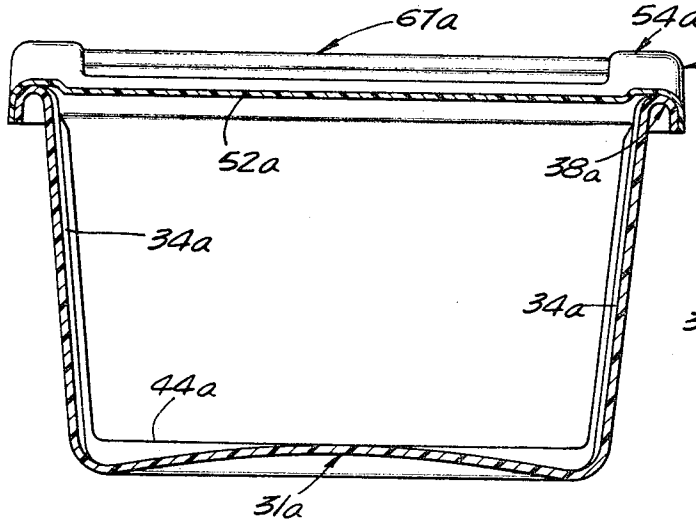


FIG. 13.

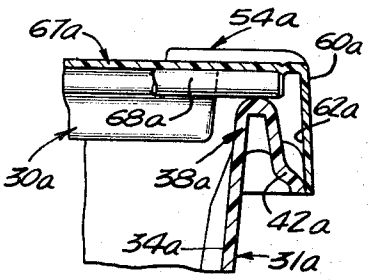


FIG. 14.

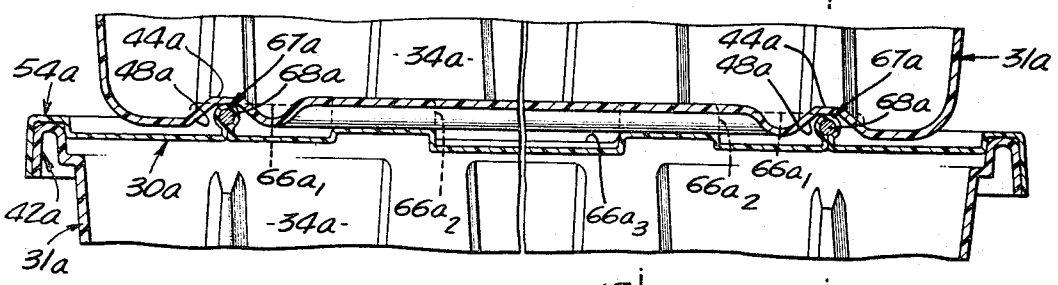
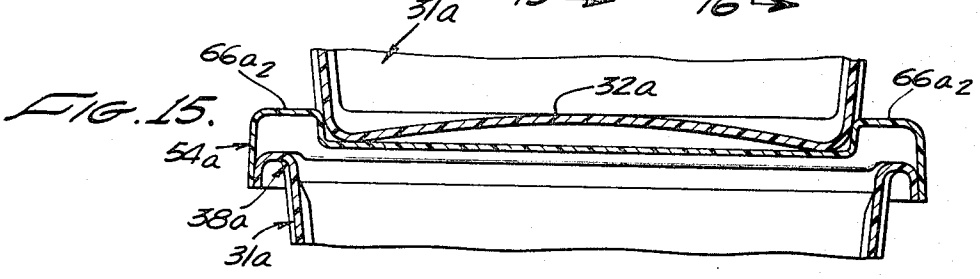


FIG. 15.



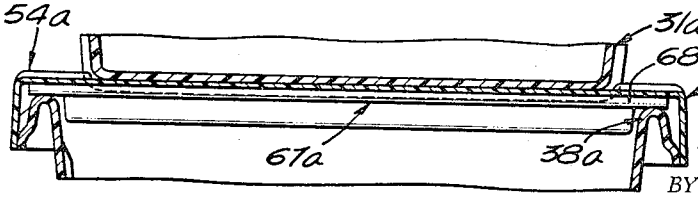


FIG. 16.

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Dec. 31, 1968 D. J. ASENBAUER 3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

Filed Oct. 23, 1965 Sheet 5 of 6

FIG. 17.

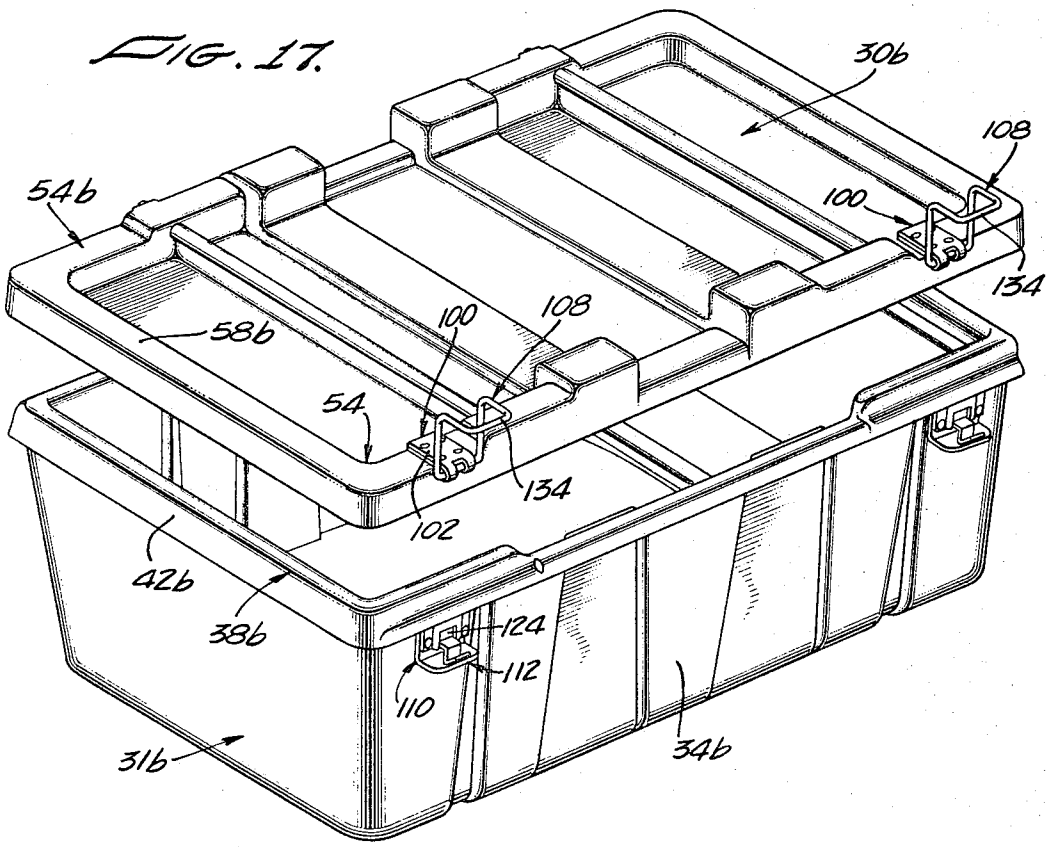
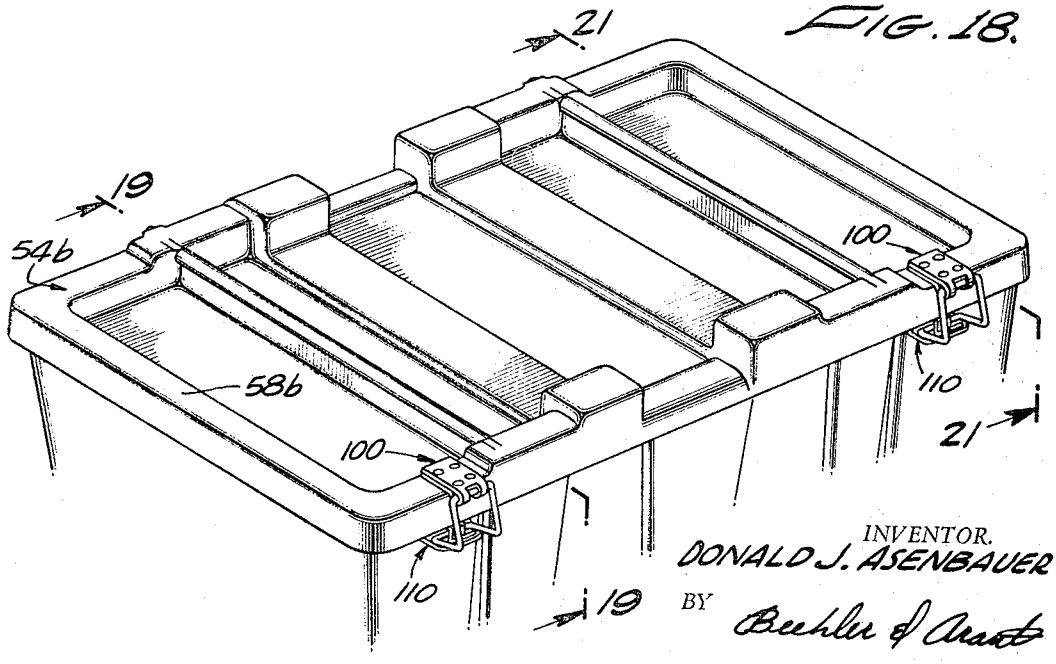


FIG. 18.



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Dec. 31, 1968 D. J. ASENBAUER 3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

Filed Oct. 23, 1965 Sheet 6 of 6

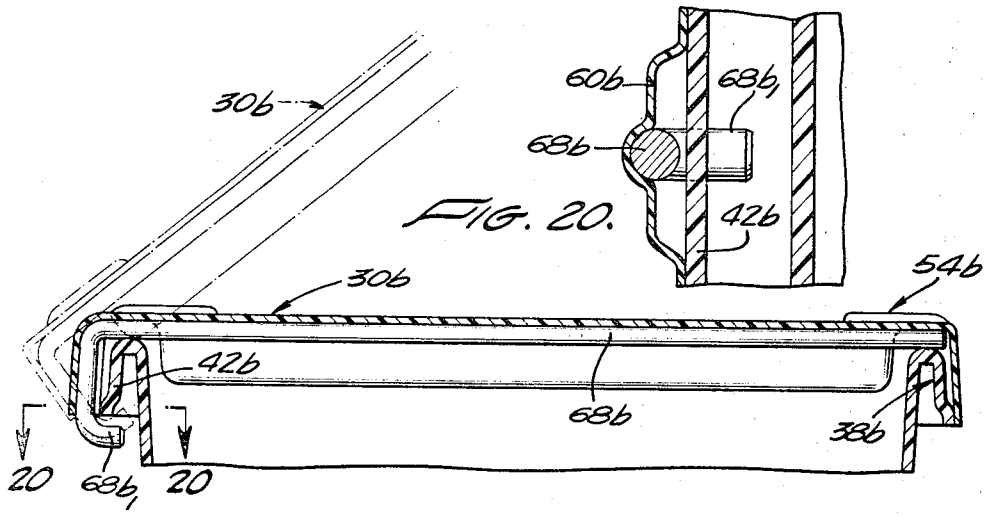


FIG. 20.

FIG. 19

FIG. 21.

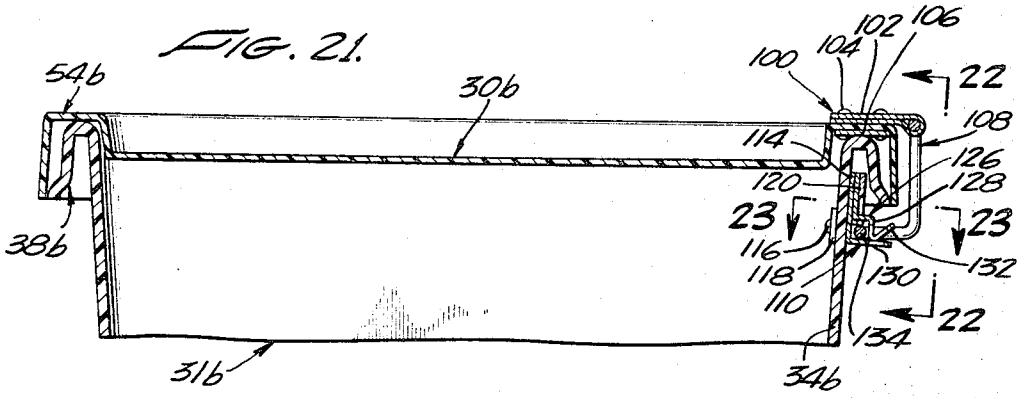
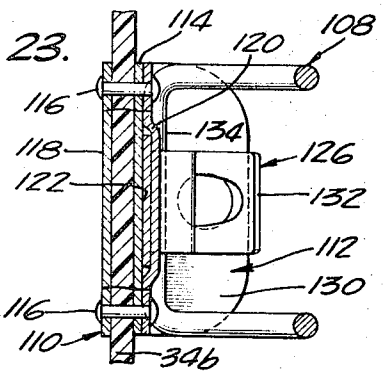


FIG. 23.



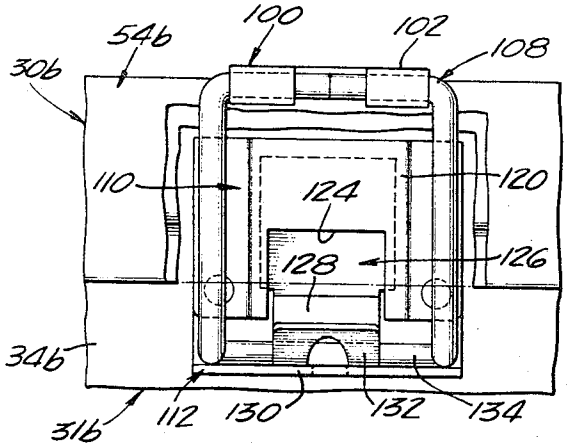


FIG. 22.

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United States Patent Office 3,419,184 Patented Dec. 31, 1968

3,419,184

CONTAINER LID WITH ENCAPSULATED REINFORCING MEMBERS

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Filed Oct. 23, 1965, Ser. No. 504,030
12 Claims. (Cl. 220—97)

This invention relates generally to containers and has more particular reference to novel reinforced lids for containers, particularly stacking and nesting containers.

Many commercial products are handled in reuseable containers. In order to conserve storage and shipping space, these containers are generally constructed in such a way that they may be stacked when filled and either stacked or nested when empty. In many applications, it is desirable to provide the containers with lids for retaining the contents in the containers, preventing damage to the contents, and/or sealing the containers against the entrance of dirt and other foreign matter. Occasionally, the lids are required to be locked to the containers to prevent the unauthorized removal of the container contents.

Some stacking containers have generally uniform cross-sectional dimensions from the top to the bottom. Fabrication of lids for these containers presents no particular design problem insofar as the load supporting capability of the lids is concerned. The reason for this is, of course, that when such containers are stacked, the bottom of each container directly overlies the upper edges of the side walls of the adjacent lower container. Accordingly, the stacking loads are transferred from each container directly to the side walls of the adjacent lower container through the interventing rim of the lid on the latter container. The stacking load on each container, therefore, imposes, not a bending load on its respective lid, but rather a simple compressive load on the intervening thickness of the lid rim between the upper edges of the container side walls and the bottom of the adjacent upper container.

On the other hand, the sides of some containers are vertically tapered. For example, nesting containers are thus tapered to permit these containers to be nested one inside of the other when empty. Fabrication of lids for such nesting containers does present a design problem relative to the load supporting capability of the lids. Thus, when nesting containers, equipped with lids, are stacked, the bottom of each container rests on the central, unsupported portion of the lid on the adjacent lower container. This is due to the small cross sectional dimensions of the bottom of each container relative to the cross sectional dimensions of the top of the adjacent lower container. Accordingly, the stacking load imposed on each container creates a substantial bending moment or load on its respective lid. One requirement of lids for vertically tapered stacking containers, then, is relatively high effective bending strength and, therefore, high load supporting capability.

It is evident, of course, that when vertically tapered stacking containers with lids are properly stacked, the stacking loads are transferred from the bottom of each container, through the lid of the adjacent lower container to the walls of the latter container, and then through these walls to the lid of the next lower container. Accordingly, a further requirement of lids for tapered stacking containers is the ability to effectively transfer the stacking loads to the container side walls. This requirement, of course, is related to the bending strength and load supporting capability of the lids.

When stacking containers one on top of the other, it is essential, for safety reasons, to maintain the containers

in vertical alignment in order to afford the final container stack with maximum stability. This, in turn, necessitates accurate relative positioning of the adjacent containers in the stack. Preferably, adjacent containers are positively interlocked against relative movement from their proper relative stacking positions. Accordingly, another desirable feature, or requirement, of lids for stacking containers is the ability to interlock with the adjacent containers in a container stack in such a way as to maintain the adjacent containers in their proper stacking positions.

Other desirable features or requirements of lids for stacking containers are simplicity of construction, economy of manufacture, minimum weight, resistance to corrosion of the lid reinforcing members when these members are metallic, pleasing appearance, and, in some cases, security against unauthorized removal.

It is a general object of this invention to provide novel container lids which satisfy the foregoing and other requirements of lids for stacking containers.

A more specific object of the invention is to provide novel container lids which are reinforced in a new and unique way to maximize their effective bending strength and hence load supporting capability, thereby to uniquely adapt the lids for use on stacking containers, particularly vertically tapered stacking containers.

Yet another object of the invention is to provide novel reinforced lids for stacking containers wherein the lid reinforcing means and containers are uniquely constructed to interlock in such a way as to maintain the several containers in a container stack in proper stacking relation.

A further object of the invention is to provide novel lids for stacking containers which are uniquely constructed to effectively transfer stacking loads to the side walls of the containers on which they are mounted.

A still further object of the invention is to provide novel container lids with metal reinforcing members which are encapsulated within the lids in such a way as to shield the major portions of these members against corrosion.

Still a further object of the invention is to provide a container and a reinforced lid therefore which may be locked to prevent unauthorized access to the container, and wherein the lid reinforcing members are uniquely constructed to form a part of the lid locking means.

Other objects of the invention are concerned with providing novel reinforced container lids which are relatively simple in construction, light weight, capable of economical manufacture by a simple plastic vacuum forming process, pleasing in appearance, and otherwise ideally suited to their intended purposes.

Other objects, advantages, and features of the invention will become readily evident as the description proceeds.

With these and such other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the invention, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims, and illustrated in the accompanying drawings.

In these drawings:

FIGURE 1 is a perspective view of a reinforced lid according to the invention illustrating the lid installed on a container;

FIGURE 2 is a fragmentary perspective view of the container in FIGURE 1 with the lid removed;

FIGURE 3 is a section taken on line 3—3 in FIGURE 1;

FIGURE 4 is a section taken on line 4—4 in FIGURE 3;

FIGURE 5 is an enlarged section taken on line 5—5 in FIGURE 3;

FIGURE 6 is a fragmentary vertical section taken

through two stacked containers, illustrating the manner in which each container in a stack is vertically supported on the cover of the adjacent lower container;

FIGURE 7 is a section taken on line 7—7 of FIGURE 6;

FIGURE 8 is a section taken on line 8—8 in FIGURE 6;

FIGURE 9 is a perspective view of a modified reinforced lid according to the invention illustrating the lid installed on a slightly modified container;

FIGURE 10 is a fragmentary perspective view of the container in FIGURE 9;

FIGURE 11 is a section taken on line 11—11 in FIGURE 9;

FIGURE 12 is a section taken on line 12—12 in FIGURE 11;

FIGURE 13 is a fragmentary section taken on line 13—13 of FIGURE 11;

FIGURE 14 is a fragmentary vertical section taken through two containers of the type shown in FIGURE 9 and illustrating, particularly, the manner in which the bottom of the upper container rests on the lid of the lower container;

FIGURE 15 is a section taken on line 15—15 of FIGURE 14;

FIGURE 16 is a section taken on line 16—16 in FIGURE 14;

FIGURE 17 is a perspective view of a reinforced locking lid according to the invention illustrating the lid disposed over a container on which it is adapted to be installed;

FIGURE 18 is a perspective view of the lid and container in FIGURE 17 illustrating the lid installed on and locked to the container;

FIGURE 19 is a section taken on line 19—19 of FIGURE 18 illustrating, in phantom outline, the manner in which the lid is installed on the container;

FIGURE 20 is an enlarged section taken on line 20—20 in FIGURE 19;

FIGURE 21 is a section taken on line 21—21 in FIGURE 18;

FIGURE 22 is an enlarged view, partly broken away for the sake of clarity, looking in the direction of the arrows on line 22—22 in FIGURE 21; and

FIGURE 23 is an enlarged section taken on line 23—23 in FIGURE 21.

Referring first to FIGURES 1 through 8 of these drawings, there is illustrated a reinforced lid 30 according to the invention and a container 31 on which the lid is adapted to be installed. Container 31 has a rectangular bottom wall 32, upstanding, upwardly diverging side and end walls 34 and 36 respectively, and a rim 38 about the upper edges of the side and end walls. Container 31 may be conveniently fabricated from relatively light weight plastic by a vacuum forming process. The side and end walls of the container may be tapered, as shown, for various reasons. For example, these walls may be tapered merely to facilitate removal of the container from a die cavity or for the sake of pleasing appearance. The side and end walls of the illustrated container are tapered, however, to permit a number of these containers to be nested one inside of the other, when empty. The container rim 38 includes an upper wall 40 which extends outwardly from the upper edges of the side and end walls 34, 36 and an outer lip 42 which depends from the outer edge of the upper rim wall 40. The lip 42 slopes outwardly in the direction of its lower edge. The bottom side and end edges of the container are rounded, as shown.

The container side and end walls 34 and 36 are embossed to form thereon the illustrated reinforcing rib formations. These rib formations include arcuate bottom wall rib formations 44 and generally flat, vertically tapered side wall rib formations 46. The two bottom wall rib formations 44 are located adjacent and generally parallel the ends of the container. These rib formations define stacking grooves 48 in the underside of the bottom wall 32 of the container. The side wall rib formations 46 are centered relative to and rise from the ends of the bottom wall rib formations 44.

Extending into the upper side of the longitudinal portions of the container rim 38 are arcuate grooves or notches 50. Each notch 50 at one side of the container is coaxially aligned with the corresponding notch at the opposite side of the container to form a notch pair. At this point, it is significant to note that the axes of the notch pairs are vertically aligned with the bottom wall stacking grooves 48, respectively.

The reinforced stacking lid 30 comprises a unitary body including a central, generally rectangular wall member 52 bounded by a parametrical rim 54. Rim 54 includes an inner wall 56 which rises from the outer edge of the wall member 52, an upper wall 58 which extends outwardly from the upper edge of the inner wall 56, and a lip 60 which depends from the outer edge of the upper rim wall 58. The inner rim wall 56 has substantially the same slope as the side and end walls 34, 36 of the container 31. The upper rim wall 58 parallels the wall member 52. The outer rim lip 60 has substantially the same slope as the lip 42 of the container rim 38. The lid rim 54 defines a downwardly opening channel 62 about the wall member 52 of the lid. Intermediate the ends of the lid, the wall member 52 is stepped upwardly to form a central rib formation 64, and the rim 54 is stepped inwardly and upwardly to form projecting boss like formations 66 at the ends of the rib formation 64. The purpose of these formations will be explained presently.

Extending across the lid 30, about midway between the central rib formation 64 and the ends of the lid, are a pair of raised reinforcing-stacking rib formations 67. These rib formations comprise metal reinforcing rods 68 which are located above the upper surface of the wall member 52 a distance such that the upper surfaces of the rods are substantially flush with the upper wall 58 of the lid rim 54. Wall member 52 extends over and around the rods in such a way as to encapsulate the rods and form vertical ribs 70 between the rods and the wall member proper. The reinforcing rods 68 and ribs 70, therefore, together constitute the rib formations 67. The ends of the reinforcing rods 68 project into and across the lid channel 62, whereby the rod ends are exposed within this channel, at opposite sides of the lid.

Lid 30 is dimensioned to fit over the top of the container 31 in such a way that the container rim 38 engages in and generally complements the lid channel 62. When the lid is properly installed on the container, the inner wall 56 of the lid rim 54 seats against the inner surfaces of the container side and end walls 34, 36 and the upper wall 58 of the lid rim seats against the upper wall 40 of the container rim 38, except in the regions of the lid rim formation 66. The lip 60 of the lid rim seats flat against the lip 42 of the container rim about the entire circumference of the lid, thereby to effectively seal the lid to the container in such a way as to prevent entrance of dirt and other foreign matter into the container. The reinforcing rods 68 on the lid 30 are located to register with the notches 50 in the container rim 38. Accordingly, when the lid is placed on the container, the ends of the rods seat in these notches.

It will be recalled that the notches 50 in the container rim 38 are vertically aligned with the stacking grooves 48 in the bottom wall 32 of the container 31. Accordingly, when the lid 30 is installed on the container, the reinforcing rods 68 on the lid are located directly over the stacking grooves. As a consequence, a number of the containers 31, may be stacked one on top of the other in such a way that the reinforcing-stacking rib formations 67 on the lid of each container engage in the stacking grooves 48 of the adjacent upper container, as shown

in FIGURE 6. The reinforcing rods **68** embodied in the rib formations **67**, therefore, serve a threefold function. First, engagement of the rods on the lid of each stacked container in the rim notches **50** of the respective container and in the stacking grooves **48** of the adjacent upper container positively locate the adjacent stacked containers in the endwise direction relative to one another, thereby to maintain the adjacent containers in proper stacking relation in the endwise direction. Secondly, the reinforcing rods serve to reinforce the lid of each container against downward bowing or deflection under the stacking load imposed thereon by the upper containers in the stack. In this regard, it is significant to note that the ribs **70** underlying the reinforcing rods provide reinforcement for the rods themselves and additional reinforcement for the lid. Third, the reinforcing rods on the lid of each stacked container effectively transfer the stacking load from the adjacent upper container to the side walls of the lower container. The stacking load is then transferred thru the container side walls to the reinforcing rods on the lid of the next lower container.

In connection with the second and third functions, just stated, of the reinforcing rods **68**, it is significant to note that when containers with tapered side and end walls are stacked, as described, the bottom wall of each container overlies the central unsupported portion of the lid on the adjacent lower container. As a consequence, the stacking load imposed on the lid of each container tends to produce a substantial bending moment in the lid which must be resisted by suitable reinforcement of the lid. Also, the stacking load must be effectively transferred to the containers side walls. As already noted, the reinforcing rods **68** of the present lid **30** satisfy the foregoing requirements. These requirements for lids for containers with tapered side and end walls are in contrast to those for lids for containers with straight side and end walls. Thus, the bottom walls of the latter containers, when stacked, directly overlie the side walls of the adjacent lower containers, whereby the stacking loads are transferred from each container directly to the side walls of the adjacent lower container. As a consequence, the lids for such containers are not subject to any appreciable bending moments and, therefore, need not be execessively reinforced.

When a number of tapered containers of the type illustrated in FIGURES 1 through 8 are stacked in the manner explained above, the major portion of the stacking load imposed on each container is transferred through the portions of the container side walls **34** located directly below the reinforcing rods **68** on the container lids. In this regard it is significant to note that these maximum load bearing portions of the side walls **34** of the illustrated container **31** are reinforced against lateral deflection under stacking loads by the side wall rib formations **46**.

Referring to FIGURE 6, it will be observed that in a stack of the containers **31**, the central portion of the bottom wall **32** of each container rests on the central rib formation **64** of the lid on the adjacent lower container. This rib formation supports the bottom wall of the upper container against bowing in the region between the reinforcing rods **68** on the lid of the lower container. Bowing of the bottom wall of the container is further resisted by the illustrated longitudinal rib formations in this wall. The central rib formation **64** on the lid **30**, of course, also reinforces the lid against bowing under the load imposed thereon by the bottom wall of an adjacent upper container in a container stack.

As noted earlier, the reinforcing rods **68** aid in maintaining the adjacent containers in a container stack in proper stacking relation in their endwise direction. Safe and efficient stacking of such containers, however, further requires retention of the adjacent containers in proper stacking relation in their transverse direction. The central rim formations **66** on the lid **30** are provided for this purpose. Thus, it will be observed in FIGURE 8 that the spacing between the inner confronting walls of the rim formations **66** is just slightly greater than the bottom width of the container **31** in line with these formations. Also the height of the rim formations **66**, above the central rib formation **64** on the lid **30**, is slightly greater than the radius of curvature of the rounded bottom edges of the container. Accordingly, the rim formations **66** on the lid of each container in a stack of the containers **31** are effective to maintain the adjacent stacked containers in proper stacking relation in their transverse direction.

The reinforced lid **30** described above may be constructed in various ways and of various materials. However, because of its reinforced construction and illustrated shape, the lid may be conveniently fabricated from relatively lightweight plastic by the vacuum moulding process disclosed in my co-pending application Ser. No. 461,313, filed June 4, 1965 and entitled Stackable Container, and Mould and Apparatus for Making.

It is evident at this point that the reinforced lid **30** may be used on a container without the rim notches **50**. In this case, the ends of the reinforcing rods **68** on the lid would merely seat on the flat upper walls **40** of the container rim **38**. The provision of notches in the container rim to seat the ends of the reinforcing rods, however, is preferable to provide positive endwise location of adjacent stacking containers relative to one another, as described earlier.

Reference is now made to FIGURES 9 through 16 which illustrate a modified reinforced lid **30***a* and a modified container **31***a* on which the lid is adapted to be installed. The lid **30***a* and container **31***a* are substantially identical in all essential respects to the lid **30** and container **31** described earlier and differ from the latter lid and container primarily only in shape. Accordingly, the various parts of the lid **30***a* and container **31***a* will be designated by the same reference numerals, with the letter subscript *a*, as the corresponding parts of the earlier described lid and container. Also, the description of the modified lid and container will be somewhat abbreviated.

With this in mind, the container **31***a* comprises a generally rectangular bottom wall **32***a*, having rib formations **44***a* defining stacking grooves **48***a* in the underside of the bottom wall. The side walls **34***a* of the container have vertically tapered reinforcing rib formations **46***a* which rise from opposite ends of the bottom rib formations **44***a*. The open top of the container **31***a* is bounded by a rim **38***a* having an upper wall **40***a* and an outer depending lip **42***a*. The portions of the rim **38***a* extending along the upper edges of the container side walls **44***a* are centrally recessed at $38a_1$. The length of the recesses $38a_1$ is substantially equal to or slightly greater than the bottom width of the container **31***a*, measured between the ends of the stacking grooves **48***a*. The spacing between the stacking grooves **48***a* is equal to the spacing between the central recessed portions of the container rim **38***a*. These recessed portions are provided to permit cross stacking of a number of the containers **31***a* when these containers are not equipped with lids **30***a*. When cross stacking the containers, the latter are placed one on top of the other in such a way that the adjacent containers are disposed at right angles to one another and the recessed rim portions $38a_1$ of each container engage in the bottom wall stacking grooves **48***a* of the adjacent upper container.

Lid **30***a* has a central wall member **52***a* bounded by a parametrical rim **54***a* including an inner wall **56***a*, an upper wall **58***a*, and an outer depending lip **60***a*. This rim defines a downwardly opening channel **62***a* about the lid for receiving the container rim **38***a* when the lid is placed in the container **31***a*. The upper surface of the end portions of the rim **54***a* are located in a common plane generally parallel to the wall member **52***a*. Inwardly of these co-planar end portions, the rim is stepped upwardly to form raised outer rim formations $66a_1$ and further raised

inner rim formations $66a_2$. The inner rim formations $66a_2$ are spaced to define therebetween central recessed rim formations $66a_3$, the upper surfaces of which are located below the co-planar ends of the rim **54***a*. Extending between the outer rim foundation $66a_1$ are reinforcing-stacking rib formations **67***a* including metal reinforcing rods **68***a* which are encapsulated by the wall member **52***a*. In the regions between the latterly aligned inner rim formations $66a_2$, the wall member **52***a* is stepped upwardly to form reinforcing rib formations **64***a*. Referring to FIGURE 11, it will be observed that the upper surfaces of the reinforcing rods **68***a* are disposed substantially in the same plane as the upper walls of the outer rim formations $66a_1$. The undersurfaces of the reinforcing rods are disposed substantially in the same plane as the undersurfaces of the upper walls **58***a* on the co-planar ends of the lid rim **54***a*.

Lid **30***a* is so dimensioned that when the lid is placed on the container **31***a*, the container rim **38***a* engages in and generally complements the parametrical lid channel **62***a*. The upper wall **58***a* of the lid rim **54***a*, within the co-planar end portions thereof, seats on the upper wall **40***a* of the container rim **38***a*, within the raised end portions of this rim. The upper wall of the lid rim, within the central recessed portions $66a_3$ thereof, seats on the upper wall of the container rim, within the central recessed portions $38a_1$ thereof. Finally, the outer lip **60***a* of the lid rim **54***a* seats against the outer lip **42***a* of the container rim **38***a*, about the entire circumference of the lid **30***a*, to seal the lid to the container. When the lid **30***a* is thus installed on the container **31***a*, the end portions of the reinforcing rods **68***a*, which are exposed within the lid channel **62***a*, rest on the raised end portions of the container rim **38***a* at positions directly over the bottom wall stacking grooves **48***a* in the container.

It is now evident that a number of the containers **31***a*, when equipped with the reinforced lids **30***a*, may be stacked one on top of the other in such a way that the reinforcing-stacking rib formations **67***a* on the lid of each container engage in the bottom wall stacking grooves **48***a* in the adjacent upper container, as illustrated in FIGURE 14. The bottom wall **32***a* of each container, in the region between its stacking grooves, is supported on the reinforcing rib formations **64***a* of the lid **30***a* on the adjacent lower container, also as shown in FIGURE 14. Accordingly, the reinforcing-stacking rib formations **67***a* on the lids **30***a* of the stacked containers serve to retain the containers in proper stacking relation in their endwise direction, as before. The reinforcing rods **68***a* embodied in the rib formations **67***a* reinforce the container lids **30***a* against downward bowing or deflection under the stacking loads imposed thereon by the upper containers in the stack and transfer these stacking loads to the side walls **34***a* of the respective containers. The inner elevated rim formations $66a_2$ on the container lids locate the adjacent containers in a transverse direction, as in the earlier form of the invention, and thereby retain the stacked containers in proper stacking relation in the transverse direction. The lid of each container is centrally supported on the side walls of the respective container by engagement of the central recessed rim portions $66a_3$ of the lid with the central recesssed portions $38a_1$ of the container rim.

At this point, it should be noted that one significant difference between the lid **30** described earlier and the lid **30**α just described resides in the fact that in the latter lid, the rim **54***a* is stepped upwardly at the ends of the reinforcing rods **68***a* in such a way as to permit the undersurfaces of the rods to be disposed substantially flush with the undersurfaces of the co-planar end portions of the upper rim wall **58***a* which seat on the container rim **38***a*. Accordingly, it is unnecessary to notch the container rim to receive the reinforcing rods. This is in contrast to the lid **30**, described earlier, wherein the reinforcing rods are located below the under, container rim engaging surface of the upper rim wall **58**, thus requiring the container rim **38** to be notched at **50** to receive the ends of the reinforcing rods. It is evident, of course, that the rim **54** of the latter lid may be stepped at the ends of the reinforcing rod **68**, in a manner similar to the rim of the lid **30***a*, in order to permit the undersurfaces of the rods to be disposed flush with the undersurfaces of the upper rim wall **58** and thereby eliminate the need for the container rim notches **50**.

Reference is now made to FIGURES 17 through 23 which illustrate a further modified reinforced lid and container according to the invention which embody locking means for locking the lid to the container. This lid and container are substantially identical, except for the locking means thereon, to the lid **30***a* and container **31***a*, just described. Accordingly, lid **30***b* and container **31***b* will not be described in detail and those parts of the lid and container which are referred to will be designated by the same basic reference numerals, with the latter subscript *b*, as the corresponding parts of the lid **30***a* and container **31***a*.

Referring now particularly to FIGURES 19 and 20, it will be observed that each of the reinforcing rods **68***b* embodied in the lid **30***b* are extended and bent at one end to define a hook $68b_1$. The lip **60***b* of the lid rim **54***b* is deformed slightly in the regions of these hooks so as to extend about the latter in the manner illustrated in FIGURE 20. Hooks $68b_1$ are so dimensioned that when the lid **30***b* is placed on the container **31***b*, the hooks engage under the lower edge of the container rim lip **42***b*, as shown in FIGURE 19, to lock the adjacent side of the lid **30***b* to the container. When placing the lid on the container, the lid is initially disposed in the angular position illustrated in phantom outline in FIGURE 19 to permit the hooks $68b_1$ to be engaged under the rim lip **42***b* of the container. The lid is then rotated downwardly to its full line, final position of assembly on the container.

Secured to the lid rim **54***b*, along the side thereof opposite the hooks $68b_1$, are a pair of latch parts **100**. Each latch part **100** comprises a bracket **102** which seats against the upper wall **58***b* of the lid rim and is secured to the rim by rivets **104** which extend through the upper rim wall and an underlying backing plate **106**. Pivotally mounted in each bracket **102** is a generally L-shaped latch bail **108** fabricated from a metal rod which is bent into the configuration illustrated.

Mounted on one side wall **34***b* of the container **31***b*, directly behind and below the lip **42***b* of the container rim **38***b*, are second latch parts **110**. Each latch part **110** comprises a generally L-shaped bracket **112** including a vertical plate **114** which seats against the adjacent container side wall **34***b* and is secured to this side wall by rivets **116** which extend through the side wall and an inner backing plate **118**. Seating against the front surface of and secured by the rivets **116** to each bracket plate **114** is a retainer plate **120**. The central portion of each retainer plate is spaced forwardly from the adjacent bracket plate **114** to define therebetween a guideway **122**. Each retainer plate **120** has a rectangular notch **124** in its lower edge. Slideable in the guideway **122** of each latch bracket **112** is a keeper **126**. As shown best in FIGURE 21, keeper **126** has a lower tongue **128** which extends outwardly thru the respective retainer plate slot **124**, then downwardly toward the underlying, outwardly directed plate **130** of the respective latch bracket **112**, and finally upwardly at an acute angle to the latter plate to define a cam **132**. The latch keepers **126** are freely slideable in the latch bracket guideways **122**, whereby when the container **31***b* is disposed in its normal upright position, the keepers are retained, by gravity, in their lower latching positions of FIGURE 21.

The latch parts **100** and **110** are so located that when the lid **30***b* is placed on the container **31***b*, each latch part **100** is aligned with the corresponding latch part **110**. The latch bails **108** are so dimensioned that when the

lid is fully seated on the container, each bail is rotatable to its latching position of FIGURE 21, wherein the outer connecting portion **134** of the bail is caged between the bracket **112** and the keeper **126** of the respective latch part **110**. During this rotation of the bails to their latching positions, the latch keepers **126** are commed upwardly sufficiently to allow the bails to enter their latching positions by engagement of the connecting portions **134** on the bails with the upturned ends or cams **132** on the keepers. The keepers are then returned by gravity to the latching positions of FIGURE 21. It is evident at their point that when the latch bails **108** are disposed in their latching positions, the lid **30***b* is locked to the container **31***b*. The mating latch parts **100, 110** are released, to permit removal of the lid from the container, by manually raising the latch keepers **126** sufficiently to clear the connecting portions **134** of the latch bails **108** and thereby permit rotation of these bails from their latching positions. If desired, the latch brackets **112** and keepers **126** may be apertured, as shown, to receive wire seals, locks, or the like. It is apparent that the latch keepers **126** may be spring actuated to latching position if desired.

It is evident from the preceding description that a number of the containers **31***b*, when equipped with lids **30***b*, may be stacked in the same way as described earlier in connection with the lid and container of FIGURES 9 through 16.

It is now apparent that the invention herein disclosed is fully capable of attaining the several objects and advantages preliminarily set forth. While the invention has been shown and described in what is conceived to be certain of its most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. A reinforced lid for a container having a bottom wall, upstanding side and end walls, and aligned notches extending into the upper edges of two opposite upstanding walls, said lid comprising:

a wall member bounded by a parametrical rim defining a channel opening to the underside of said lid for receiving the upper edges of said upstanding container walls;

said rim having an upper wall, portions of which are disposed substantially in a common plane generally parallel to said wall member for seating contact with the upper edges of said upstanding container walls;

a reinforcing member secured to and extending across said wall member;

the ends of said reinforcing member projecting across said channel at opposite sides of said wall member for direct seating contact with the upper edges of said opposite container walls; and

said projecting ends of said reinforcing member being disposed below said plane and located for seating engagement in said container notches.

2. A reinforced lid for a container having a bottom wall, upstanding side and end walls, and a stacking groove in the underside of and extending across the bottom wall, which container is adapted to be stacked with other like containers to form a container stack wherein each container is supported on the lid of the adjacent lower container, said lid comprising:

a unitary molded plastic lid body including a wall member bounded by a raised parametrical rim having an inner wall rising from the outer edge of said wall member, an upper wall extending outwardly from the upper edge of said inner wall, and a lip depending from the outer edge of said upper wall;

said rim defining a channel about said wall member opening to the underside of said lid for receiving the upper edges of said upstanding container walls;

a reinforcing member extending across said wall member above the upper surface thereof;

the ends of said reinforcing member projecting across said channel at opposite sides of said wall member, whereby said projecting ends are disposed for direct seating contact with the upper edges of two opposite upstanding walls of said container when said lid is placed on said container; and

said wall member extending over and around said reinforcing member in the region between said projecting ends thereof so as to encapsulate said reinforcing member and define therewith a raised stacking rib engagable in said stacking groove of the adjacent upper container in said stack.

3. A reinforced lid for a generally rectangular container having a bottom wall, upstanding side and end walls, and a pair of stacking grooves in the underside of and extending across said bottom wall adjacent and generally parallel to said end walls, which container is adapted to be stacked with other like containers to form a container stack wherein each container is supported on the lid of the adjacent lower container, said lid comprising:

a unitary molded plastic lid body including a generally rectangular wall member bounded by a raised parametrical rim having an inner wall rising from the outer edge of said wall member, an upper wall extending outwardly from the upper edge of said inner wall, and a lip depending from the outer edge of said upper wall;

said rim defining a channel about said wall member opening to the underside of said lid for receiving the upper edges of said upstanding container walls;

a pair of reinforcing members extending across said wall member above the upper surface thereof adjacent and generally parallel to the ends of said wall member;

the ends of said reinforcing members projecting across said channel at opposite sides of said wall member, whereby said projecting ends are disposed for direct seating contact with the upper edges of said container side walls when said lid is placed on said container;

said reinforcing members being located to register with the stacking grooves in the bottom wall of the adjacent upper container in said stack; and

said wall member extending over and around said reinforcing members in the regions between said projecting ends thereof so as to encapsulate said reinforcing members and define therewith raised stacking ribs engagable in said stacking grooves of the adjacent upper container in said stack.

4. A reinforced lid for a container having a bottom wall, upstanding side and end walls, and a rim extending outwardly from the upper edges of said upstanding walls, said lid comprising:

a wall member bounded by a parametrical rim for seaton said container rim;

a pair of generally parallel reinforcing members secured to and extending across said wall member;

the ends of said reinforcing members projecting across said lid rim at opposite sides of said wall member, whereby said projecting ends are disposed to overlie in vertical supporting relation said container rim at opposite sides of said container when said lid is placed on said container; and

two corresponding projecting ends of said reinforcing members extending below said lid rim and then inwardly to define hooks for engaging under said container rim.

5. In combination:

a generally rectangular molded plastic container having a bottom wall, upstanding side and end walls, a rim about the upper edges of said upstanding walls in-

cluding an upper wall extending outwardly from the upper edges of said upstanding walls and a lip depending from the outer edge of said upper rim wall, and a air of stacking grooves in the underside of and extending across said bottom wall adjacent and generally parallel to said end walls; and

a lid on said container including a unitary molded plastic body having a generally rectangular wall member bounded by a raised parametrical rim including an inner wall rising from the outer edge of said wall member, an upper wall extending outwardly from the upper edge of said inner wall, and a lip depending from the outer edge of said latter upper wall, said lid rim defining a channel opening to the underside of said lid and receiving said container rim, said rim lips being disposed in sealing contact, a pair of reinforcing members extending across said wall member above the upper surface thereof adjacent and generally parallel to the ends of said wall member, the ends of said reinforcing members projecting across said channel at opposite sides of said wall member and being disposed in vertical supporting contact with the upper edges of said container side walls, said wall member extending over and around said reinforcing members so as to encapsulate said reinforcing members in the regions between said projecting ends thereof and defining with said reinforcing members raised stacking rib formation on said lid, and said rib formations being vertically aligned with said container stacking grooves, whereby said container is adapted to be stacked with other like containers to form a container stack wherein the bottom of each container is supported on the lid of the adjacent lower container and said rib formations on the lid of each container engaged in said stacking grooves of the adjacent upper container to restrain the adjarent containers against relative movement in a transverse direction of said rib formations.

6. The combination according to claim **5** wherein:

said lid rim includes elevated container locating portions at opposite ends of said rib formation for restraining the adjacent containers in said stack against relative movement in the endwise direction of said rib formations.

7. In combination:

a container having a bottom wall, upstanding side and end walls, and a rim extending outwardly from the upper edges of said upstanding walls;

a lid on said container including a wall member bounded by a parametrical rim, said lid rim seating on said container rim, a pair of generally parallel reinforcing members extending across and secured to said wall member, the ends of said reinforcing members projecting across said lid rim at opposite sides of said wall member and being disposed in vertical supporting relation to the upper edges of the adjacent upstanding container walls, and two corresponding projecting ends of said reinforcing members extending below said rim and then inwardly to define hooks engaging under said container rim to secure one side of said lid to said container; and

cooperating latch means on the opposite side of said lid and on said container for releasably locking said lid to said container.

8. The combination according to claim **7** wherein:

said cooperating latch means comprises a first latch part on said lid and the second latch part on said container;

said first latch part comprises a bracket secured to the upper side of said lid rim and a generally L-shaped latch bail pivotally mounted on said bracket on an axis generally parallel to the adjacent side of said lid rim and including an outer bail member extending generally parallel to said axis; and

said second latch part comprises a generally L-shaped bracket including a first plate secured to the adjacent container side wall and a second plate extending outwardly from the lower edge of said first plate, and a keeper mounted on the first bracket plate for normally vertical movement relative thereto between a latching position of engagement with said second bracket plate and an unlatching position remote from said second bracket plate, said keeper having an inclined camming end; and

said latch bail is swingable to and from a latching position wherein said bail member is caged between said keeper and said bracket of said second latch part and through a position wherein said bail member engages said camming end of said keeper to elevate said keeper to its unlatching position.

9. A latch for containers and the like comprising:

first and second cooperating latch parts;

said first latch part including a bracket and a generally L-shaped bale pivotally mounted on said bracket, said bail having an outer bail member extending generally parallel to the pivot axis of said bail; and

said second latch part comprising a generally L-shaped bracket including a first plate and a second plate extending transversely from one end of said first plate, a keeper slideably mounted on said first plate for movement to and from a latching position of engagement with said second plate wherein said latter bracket and keeper define therebetween a space for receiving and caging said bail member when said latch bail is disposed in latching position relative to said second latch part, and said keeper including a camming surface engagable by said bail member for elevating said keeper from said latching position thereof during pivotal movement of said latch bail to said latching position thereof.

10. In combination:

a container having a bottom wall and upstanding side and end walls; and

a lid on said container including a wall member bounded by a parametrical rim, said rim seating on the upper edges of said upstanding container walls, a reinforcing member secured to and extending across said wall member, and the ends of said reinforcing member projecting across the underside of said rim at opposite sides of said wall member and being disposed in vertical supporting contact with the upper edges of the adjacent upstanding container walls;

said lid rim including an upper wall having portions located substantially in a common plane generally parallel to said wall member and disposed in seating contact with the upper edges of said upstanding container walls, and said projecting ends of said reinforcing member being disposed below said plane and engaging in notches in the upper edges of the adjacent upstanding container walls.

11. In combination:

a container having a bottom wall, upstanding side and end walls, and a stacking groove in the underside of and extending across said bottom wall; and

a lid on said container including a wall member bounded by a parametrical rim, said rim seating on the upper edges of said upstanding container walls, and a raised stacking rib formation rising above and extending across said wall member in vertical alignment with said container stacking groove, whereby said container is adapted to be stacked with other like containers to form a container stack wherein the bottom of each container is supported on the lid of the adjacent lower container and said rib formation on the lid of each container engages in said stacking groove of the adjacent upper container to interlock the adjacent containers against relative movement in a transverse direction of said rib formation;

said lid further including a reinforcing member en-

capsulated within said rib formation, the ends of said reinforcing member projecting across said rim at opposite sides of said wall member and being disposed in vertical supporting relation with the upper edges of the adjacent upstanding container walls.

12. The combination according to claim **11** wherein: said lid rim includes elevated container locating portions at opposite ends of said rib formation for restraining the adjacent containers in said stack against relative movement in the endwise direction of said rib formation.

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