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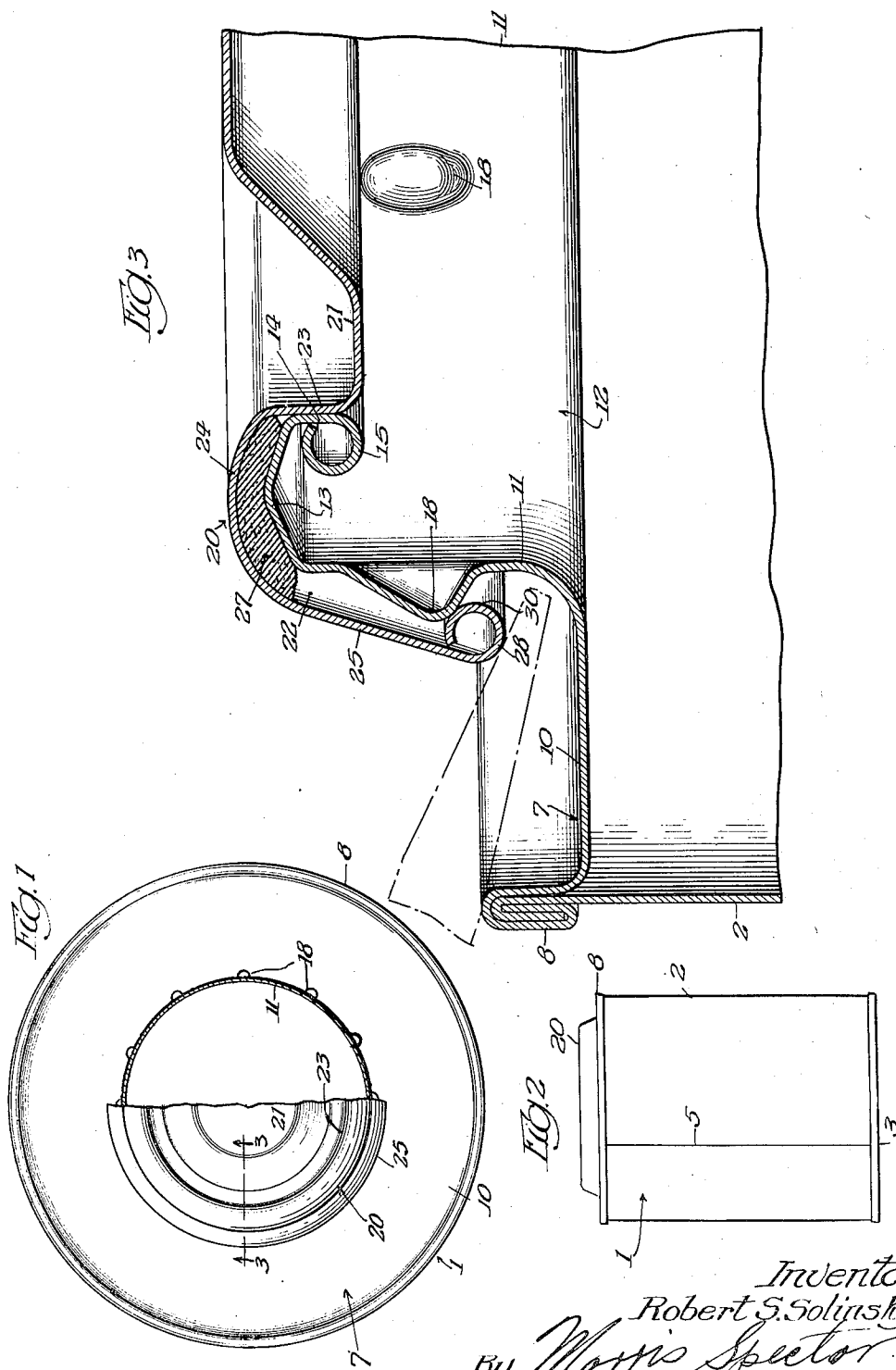
R. S. SOLINSKY

2,403,030

CAN

Filed Oct. 24, 1944

2 Sheets-Sheet 1



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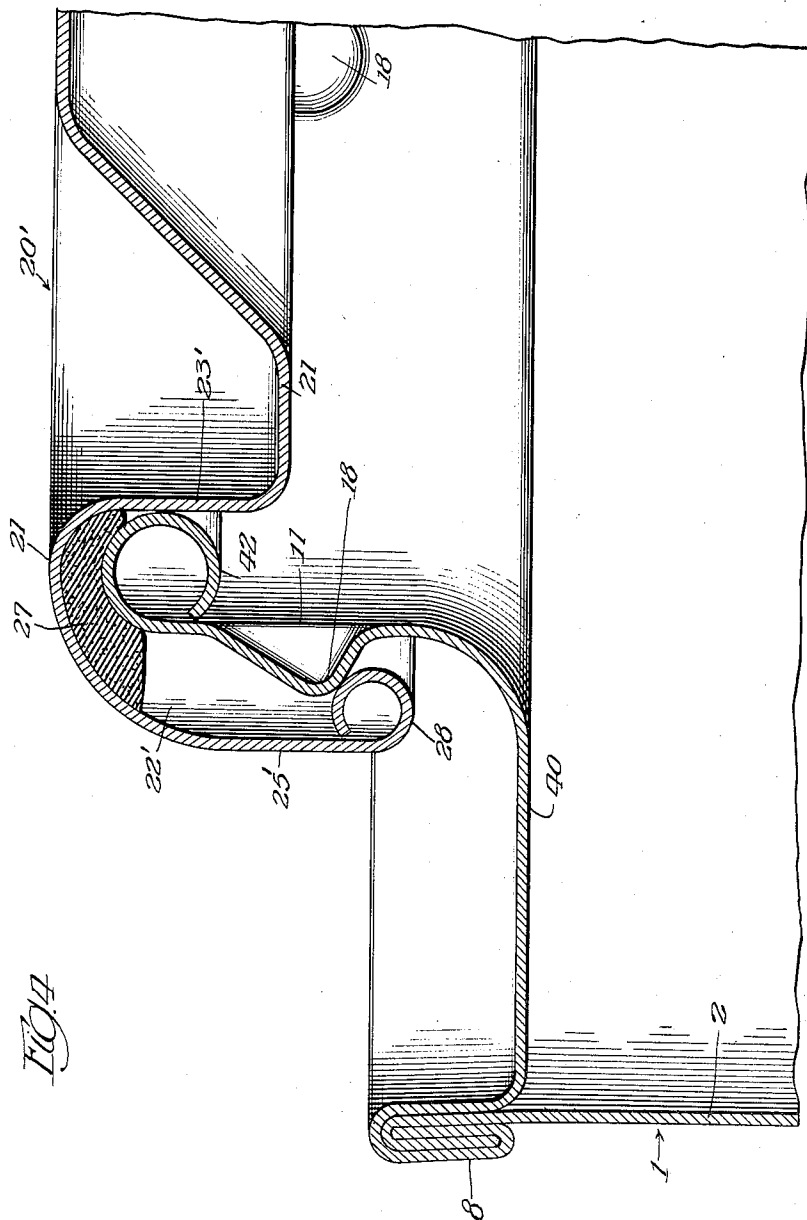
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This invention relates to cans or containers and has particular reference to the combination of a container with a removable cover so arranged that the cover may be easily placed in its closed position to maintain a perfect closure.

It is an object of the present invention to provide an air-tight, water-tight covered container wherein the cover may easily be removed without injury to the cover or to the container so that the container may be readily opened and reclosed by the same cover which will each time effect a perfect air-tight closure.

It is a further object of the present invention to provide a container of the above mentioned character adapted to receive a removable closure wherein the container includes a seat for a yieldable gasket carried by the cover and wherein the seat on the container is a continuous surface free of any seam or seams.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawings forming a part thereof.

In the drawings:

Figure 1 is a top plan view of a container embodying the present invention with part of the cover broken away;

Figure 2 is a reduced scale front view of the container of Figure 1;

Figure 3 is an enlarged fragmentary section taken along the line 3-3 of Figure 1; and

Figure 4 is a view corresponding to Figure 3 and illustrating a modified construction.

Referring now more particularly to Figures 1 and 2, the container, indicated in general by the reference numeral 1, comprises a can of sheet metal, such as tin plate, which can has a cylindrical body portion 2 and a bottom 3 permanently secured together in a manner well known in the art. The cylindrical body 2 comprises a rectangular sheet of metal which is curved into cylindrical form and the opposite end secured together along a seam 5 of any desired form. An annular end member 7 of sheet metal, such as tin plate, is secured to the cylindrical body portion 2 in any desired manner as, for instance, by a suitable seam 8, well known in the art. The annular member 7 is in the form of a sheet metal ring, having a flat annular surface 10 the outer periphery of which is joined with the cylindrical body by the seam 8. The annular surface 10 is seamless around its entire circumference. The substantially flat portion 10 of the end member 7 is formed at its inner edge to provide a short

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vertical wall 11 forming a neck which surrounds and defines an open mouth 12 for receiving or dispensing the contents of the container. The upper edge of the wall section 11 terminates in an inwardly extending curved part 13 the top surface of which constitutes a seat for a cover sealing gasket, to be more fully described as this description proceeds. The inner edge of the part 13 is curved downwardly to provide a short cover guiding surface 14 and a smooth annular curl or enlarged bead 15.

The vertical wall or neck 11 has a plurality of ribs or outwardly extending projections 18 formed therein. These projections are all at a uniform distance below the top of the annular end member and are spaced any desired distance apart, for instance, a fraction of an inch between the centers of adjacent ribs or projections 18. These projections are made by pressing or permanently deforming the sheet metal of the end member 7.

The container 1 is provided with a flexible sheet metal removable cover 20. The cover comprises a central panelled top wall 21 which at its outer or marginal edge is formed with an inverted U-shaped annular trough or channel 22 which extends around the periphery of the cover. The channel is defined by an inner channel wall 23, a bight portion 24 and an outer channel wall 25. The bight portion 24 contains a sealing gasket 27 of rubber or the like which engages the curved portion 13 when the cover is assembled on the container. The outer edge of the portion 25 of the channel is provided with an inwardly extending curl 28 which forms a continuous ring constituting the bottom edge of the cover 20. The inside diameter of the bottom of the cover, measured at the radially innermost part of the curl 28, exceeds the outside diameter of the neck 11 by an amount which is a major fractional part of the depth of each projection 18. By way of example, in one construction the ring of the curl 28 cleared the vertical wall of the neck by approximately .04 inch whereas the projections 18 extended outwardly approximately $\frac{1}{4}$ inch.

To assemble the cover on the container it is merely necessary to slip the part 23 of the cover into the opening defined by the wall 14, at which time the part 23 makes frictional engagement with the wall 14 around the entire perimeter of the opening. As the cover is lowered into position the surface 30 of the curl 28 engages the projections 18. Upon the application of a downward force to the cover the projections 18 deform the wall 25 of the cover 18, within the elastic lim-

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its of the material, so that the wall 25 tends to straighten out between adjacent projections 18 and is flexed outwardly at each of the projections 18 until the surface 38 of the bead 28 rides down over and past the projections, at which time the rim 25 of the cover snaps back towards its normal position, which is the position illustrated in Figure 3, with the curl 28 locked under projections 18. Due to the small inclination of that portion of the surfaces of the projections 18 which are engaged by the curl 28 the tension of the metal of the curl 28 due to the slight outward flexing thereof tends to hold the gasket 27 downwardly with appreciable pressure against the top surface 13. This maintains the gasket 27 seated on the top surface 13 and making a perfect seal against outward leakage of any of the contents of the container or against inward leakage of air in the event that the contents of the container are vacuum packed.

In order to open the container it is merely necessary to apply a stiff tool of any suitable character, such as, for instance, the end of a screw driver, in the position illustrated in Figure 3. One end of the tool is inserted under the curl 28 and the tool is fulcrumed about the top of the seam 7 by application of force to the other end of the tool. The upward force on the curl 28 causes the side 25 of the cover to deform sufficiently, but within the elastic limit of the material, so that the bead passes upwardly of the projections 18. In this connection it is to be noted that the tangent to the curl 28 at the point of contact between it and the projection 18 is at an appreciable inclination to both the horizontal and the vertical, so that an upward force applied to the bottom of the curl 28 by an opening tool will cause a spreading of the cover part 25 at the respective projections 18 in an outward direction an amount sufficient so that the curl 28 can be sprung past the projections 18.

In the operation of applying the cover to or removing the same from the container the amount of deformation of the cover in passing the projections 18 is such that the elastic limit of the material is not exceeded. As a result neither the cover nor the container is permanently deformed and the cover may be replaced and will make a tight fit regardless of the number of times that it has been previously removed and replaced. It is also apparent that due to the sliding fit at the contacting surfaces of the container portion 14 and cover portion 23 there is no possible sideways shifting of the cover, and due to the fact that the cover is held snugly in place by the spring pressure resulting from the snapping of the curl 28 past the projections 18 there is no relative movement between the surface 13 and the gasket 27 while the cover is in place, thereby reducing the likelihood of the development of a leak past the gasket.

In Figure 4 there is illustrated a modified construction. In this construction the end member 40, which corresponds to the end member 7 of Figure 3, is secured to the cylindrical body in the same manner as in Figure 3, and has the ribs 18 formed therein the same as in Figure 3. The neck portion 11 of the end member 40 has an inwardly curled enlarged annular bead 42 at the top thereof. The cover 20' of Figure 4 is somewhat similar to the cover 20 of Figure 3, or in fact the same cover design may be used, dimensioned to fit. The essential difference between the cover 20' and the cover 20 is that the channel 22' formed in the cover 20' is narrower than the channel 22

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in the cover 20. The cover 20' comprises a central panel top wall 21 which at its outer or marginal edge is formed with the channel 22' that extends around the periphery of the cover and is adapted to fit over and embrace the bead 42 of the container. The channel 22' is defined by the short inner wall 23' the inner surface of which makes a sliding contact with the bead 42 and extends above the bead to form a base for the yielding ring gasket 27. The right portion of the channel 22, indicated at 24', merges with a vertical wall 25' the lower end of which is curled as at 28.

In the container of Figure 4 it is to be noted that the curl 42 corresponds, functionally, to the part 13 and the part 15 of the container of Figure 3. The inwardly curled bead 42 contacts the inner surface of the wall or neck 11 so that when the container is inverted for pouring the contents thereof, little or none of the contents will be trapped within the neck of the container.

In compliance with the requirements of the patent statutes I have here shown and described a few preferred embodiments of my invention. It is, however, to be understood that the invention is not limited to the precise constructions here shown, the same being merely illustrative of the principles of the invention. What is considered new and desired to be secured by Letters Patent is:

1. A container comprising a body wall, an end connected to said body wall and having an upstanding seamless open neck portion spaced inwardly from the connection between the body wall and said end, said neck portion terminating in an inwardly curved annular enlarged curl around the entire perimeter of the neck opening with the end of the curl closed against the inner surface of the neck, and a detachable and replaceable flexible cover for said container, the inner side of the cover having a peripherally extending channel, a sealing gasket in said channel, the inner wall of the channel extending into and making a sliding fit with the annular curl and the gasket in the channel bearing against the top of the curl, the outer wall of the channel surrounding and being spaced from the curl, the facing surfaces of the neck and of the outer wall of the channel having interlocking means comprising a continuous inwardly projecting annular resilient curl around the bottom periphery of the outer wall of the channel, and a series of spaced outwardly extending projections on the container neck engaged by the curl in the cover closed position, the projecting curl on the cover flexing over the projections on the neck by the flexibility of the cover when the container and the cover are assembled.

2. A container having an upstanding open neck portion terminating in an inwardly curved part around the entire perimeter of the neck opening, and a detachable flexible cover for said container, the inner side of the cover having a peripherally extending channel of a width greater than the width of said inwardly curved part of the neck, a sealing gasket in said channel, the inner wall of the channel extending into and making a sliding fit with the inwardly curved part of the neck, the outer wall of the channel surrounding and being spaced from said inwardly curved part of the neck, the facing surfaces of the neck and of the outer wall of the channel having interlocking means comprising a continuous projection around the periphery of one of said surfaces and extending towards the other of

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said surfaces, and a series of spaced projections on said other surface and extending towards said first mentioned surface, said continuous projection and said spaced projections being in interlocking engagement when the cover is in its closed position, the projecting means on the cover flexing over the projecting means on the neck by the flexibility of the cover when the container and the cover are assembled, the interlocking means being spaced below the top of the neck and having cooperating smooth camming surfaces which guide the outer wall of the channel to the interlocking position during the cover closing operation.

3. A container having an upstanding open neck portion terminating in a part curved inwardly around the entire perimeter of the neck opening, the neck portion having a plurality of spaced outwardly extending projections, and a detachable cover for said container, the inner side of the cover having a peripherally extending channel which confines a sealing gasket, the inner wall of the channel extending into and making a sliding fit with said inwardly curved part of the neck, the channel being of a width substantially greater than the width of the inwardly curved part of the neck so that the outer wall of the channel surrounds and is spaced from the part of the neck that extends into the channel, the outer wall of the channel having an inwardly extending curl at its lower end which engages the under surfaces of said projections for holding the cover in position when the container and the cover are assembled.

4. A container comprising a body wall, an end connected to said body wall and having an upstanding open neck spaced inwardly from the connection between the body wall and said end, said neck portion terminating at its top in an inwardly curved part extending around its entire perimeter and forming the neck opening, said neck having radially outwardly extending projections below the top thereof and spaced from one another around the circumference of the neck, each of said projections extending along smooth curves free of sharp bends from the radially outermost portion of the projection to a merger with the rest of the neck, a detachable resilient snap-on cover, the cover having a downwardly facing channel around the periphery thereof into which the neck of the container extends, the radially inner wall of the channel making a sliding fit with the inside of the inwardly curved part of the neck, a compressible sealing gasket between the top of the open neck and the channel, the outer wall of the channel having an inward curl at the bottom thereof and extending around the periphery of the bottom of the channel, the radially innermost portion of the curl clearing the body of the neck but the amount of clearance space being less than the amount of outward protrusion of said projections, the cover curl being sufficiently resilient to permit deforming of the curl to clear the radially outermost portions of the projections without exceeding the elastic limits of the cover material whereby the resiliency of the cover tends to restore it to its original size after it has been flexed past the projections, the smooth outwardly extending surfaces of the projections below the top of the neck guiding the downwardly moving curl radially outwardly against its natural resiliency during the cover closing operation until the radially innermost part of the curl passes below the radially outermost parts of the projections where-

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upon the natural resiliency of the stressed cover forces the curl radially inwardly and below the outermost portions of the projections, the portion of the curl above the radially innermost part of the curl camming against the projections to draw the cover downwardly, the resilient gasket limiting the downward movement of the cover and being held in compression by the tension of the curl against the projections, the bottom of the curl of the channel terminating radially inwardly of the connection between the body wall and said end that is connected thereto and spaced from said end an amount sufficient to permit insertion of a pry-loose tool under said curl and fulcruming on said connection for prying the cover from the neck.

5. A container having an upstanding open neck terminating at its top in an inwardly curved part extending around its entire perimeter and forming the neck opening, said neck having radially outwardly extending projections below the top thereof and spaced from one another around the circumference of the neck, each of said projections extending along smooth curves free of sharp bends from the radially outermost portion of the projection to a merger with the rest of the neck, a detachable resilient snap-on cover, the cover having a downwardly facing channel around the periphery thereof into which the neck of the container extends, the radially inner wall of the channel making a sliding fit with the inside of the inwardly curved part of the neck, a compressible sealing gasket between the top of the open neck and the channel, the outer wall of the channel having an inward curl at the bottom thereof and extending around the periphery of the bottom of the channel, the radially innermost portion of the curl clearing the body of the neck but the amount of clearance space being less than the amount of outward protrusion of said projections, the cover curl being sufficiently resilient to permit deforming of the curl to clear the radially outermost portions of the projections without exceeding the elastic limits of the cover material whereby the resiliency of the cover tends to restore it to its original size after it has been flexed past the projections, the smooth outwardly extending surfaces of the projections below the top of the neck guiding the downwardly moving curl radially outwardly against its natural resiliency during the cover closing operation until the radially innermost part of the curl passes below the radially outermost parts of the projections whereupon the natural resiliency of the stressed cover forces the curl radially inwardly and below the outermost portions of the projections, the portion of the curl above the radially innermost part of the curl camming against the projections to draw the cover downwardly, the resilient gasket limiting the downward movement of the cover and being held in compression by the tension of the curl against the projections.

6. A container having an upstanding open neck having radially outwardly extending projections below the top thereof and spaced from one another around the circumference of the neck, each of said projections extending upwardly from the radially outermost portion of the projection to a merger with the rest of the body of the neck substantially below the top of the neck, a detachable resilient snap-on cover, the cover having a downwardly facing channel around the periphery thereof into which the neck of the container extends, the radially inner wall of the channel

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making a sliding fit inside of the neck, the outer wall of the channel having an inward curl at the bottom thereof and extending around the periphery of the bottom of the channel, the radially innermost portion of the curl clearing the body of the neck but the amount of clearance space being less than the amount of outward protrusion of said projections, the cover curl being sufficiently resilient to permit deforming of the curl to clear the radially outermost portions of the projections without exceeding the elastic limits of the cover material whereby the resiliency of the cover tends to restore it to its original size after it has been flexed past the projections, the smooth outwardly extending surfaces of the projections below the top of the neck guiding the downwardly moving curl radially outwardly against its natural resiliency during the cover closing operations until the radially innermost part of the curl passes below the radially outermost parts of the projections whereupon the natural resiliency of the stressed cover forces the curl radially inwardly and below the outermost portions of the projections, a portion of the curl camming against the projections to draw the cover downwardly, the cover being held on the container by the tension of the curl against the projections.

7. A container having an upstanding open neck having radially outwardly extending projections below the top thereof and spaced from one another around the circumference of the neck, each of said projections extending upwardly from the radially outermost portion of the projection to a merger with the rest of the body of the neck substantially below the top of the neck, a detachable resilient snap-on cover, the cover having a downwardly facing channel around the periphery thereof into which the neck of the container extends, the outer wall of the channel having an inward curl at the bottom thereof and extending around the periphery of the bottom of the channel, the radially innermost portion of the curl clearing the body of the neck but the amount of clearance space being less than the amount of outward protrusion of said projections, the cover curl being sufficiently resilient to permit deforming of the curl to clear the radially outermost portions of the projections without exceeding the elastic limits of the cover material whereby the resiliency of the cover tends to restore it to its original size after it has been flexed past the projections, the smooth outwardly extending surfaces of the projections below the top of the neck guiding the downwardly moving curl radially outwardly against its natural resiliency during the cover closing operation until the radially innermost part of the curl passes below the radially outermost parts of the projections whereupon the natural resiliency of the stressed cover forces the curl radially inwardly and below the outermost portions of the projections, a portion of the curl camming against the projections to draw the cover downwardly, the cover being held on the container by the tension of the curl against the projections.

8. A container having an upstanding open neck and a detachable flexible cover, said cover having a downwardly facing channel around the periphery thereof into which the neck extends, the radially inner wall of the channel making a sliding friction fit with the inside of the neck opening, the radially outer wall of the channel surrounding and being spaced from the neck, the facing surfaces of the neck and the outer wall

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of the channel having interlocking projecting means substantially below the top of the neck and comprising a continuous projection around one of said surfaces and extending towards the other of said surfaces, and a series of spaced projections on said other surface and extending towards said one surface, the interlocking projecting means on the neck being located below the top of the neck and merging with the portion of the neck thereabove along smooth surfaces which contact with and stretch the projecting means on the cover radially outwardly against the natural resiliency of the cover during the cover closing operation, the stretch being within the elastic limit of the cover material whereby when the radially innermost part of the projecting means on the cover passes below the radially outermost part of the projecting means on the neck the natural resiliency of the stretched cover forces the cover interlocking projecting means downwardly of the cooperating projecting means on the neck to secure the cover in place.

9. A container having an upstanding open neck and a detachable flexible cover, said cover having a downwardly facing channel around the periphery thereof into which the neck extends, the radially outer wall of the channel surrounding and being spaced from the neck, the facing surfaces of the neck and the outer wall of the channel having interlocking projecting means substantially below the top of the neck and comprising a continuous projection around one of said surfaces and extending towards the other of said surfaces, and a series of spaced projections on said other surface and extending towards said one surface, the interlocking projecting means on the neck being located below the top of the neck and merging with the portion of the neck thereabove along smooth surfaces which contact with and stretch the projecting means on the cover radially outwardly against the natural resiliency of the cover during the cover closing operation, the stretch being within the elastic limit of the cover material whereby when the radially innermost part of the projecting means on the cover passes below the radially outermost part of the projecting means on the neck the natural resiliency of the stretched cover forces the cover interlocking projecting means downwardly of the cooperating projecting means on the neck to secure the cover in place.

10. A container comprising a body wall, an end connected to said body wall and having an upstanding open neck portion spaced inwardly from the connection between the body wall and said end, said neck having radially outwardly extending projections below the top thereof and spaced from one another around the circumference of the neck, the distance between adjacent projections being substantially greater than the amount of radially outward protrusion of each projection and than the arcuate width of each projection, each of said projections extending along smooth curves free of sharp bends from the radially outermost portion of the projection to a merger with the rest of the body of the neck, a detachable resilient snap-on cover, the cover having a downwardly extending flange around the periphery thereof into which the neck of the container extends, a compressible sealing gasket between the top of the neck and the cover, the flange having an inward curl at the bottom thereof and extending around its entire periphery, the radially innermost portion of the curl clearing the body of the neck but the amount

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of clearance space being less than the amount of outward protrusion of said projections, the cover curl being sufficiently resilient to permit deforming of the curl to clear the radially outermost portions of the projections without exceeding the elastic limits of the cover material whereby the resiliency of the cover tends to restore it to its original size after it has been flexed past the projections, the smooth outwardly extending surfaces of the projections serving to guide the downwardly moving curl radially outwardly against its natural resiliency during the cover closing operation until the radially innermost part of the curl passes below the radially outermost parts of the projections whereupon the natural resiliency of the stressed cover forces the curl radially inwardly and below the outermost portions of the cover, the portion of the curl above the radially innermost part of the curl camming against the projections to draw the cover downwardly, the resilient gasket limiting the downward movement of the cover and being held in compression by the tension of the curl against the projections, the bottom of the curl terminating radially inwardly of the connection between the body wall and said end that is connected thereto and spaced from said end an amount sufficient to permit insertion of a pry-loose tool under said curl and fulcruming on said connection for prying the cover from the neck.

11. A container having an upstanding open neck, said neck having radially outwardly extending projections below the top thereof and spaced from one another around the circumference of the neck, the distance between adjacent projections being substantially greater

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than the amount of radially outward protrusion of each projection and than the arcuate width of each projection, each of said projections extending along smooth curves free of sharp bends from the radially outermost portion of the projection to a merger with the rest of the body of the neck, a detachable resilient snap-on cover, the cover having a downwardly extending flange around the periphery thereof into which the neck of the container extends, the flange having an inward curl at the bottom thereof and extending around its entire periphery, the radially innermost portion of the curl clearing the body of the neck but the amount of clearance space being less than the amount of outward protrusion of said projections, the cover curl being sufficiently resilient to permit deforming of the curl to clear the radially outermost portions of the projections without exceeding the elastic limits of the cover material whereby the resiliency of the cover tends to restore it to its original size after it has been flexed past the projections, the smooth outwardly extending surfaces of the projections serving to guide the downwardly moving curl radially outwardly against its natural resiliency during the cover closing operation until the radially innermost part of the curl passes below the radially outermost parts of the projections whereupon the natural resiliency of the stressed cover forces the curl radially inwardly and below the outermost portions of the cover, the portion of the curl above the radially innermost part of the curl camming against the projections to draw the cover downwardly, the cover being held in compression by the tension of the curl against the projections.

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