March 26, 1957 A. CLAUD-MANTLE 2,786,596

CLOSURE MEANS FOR BOX LIDS

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Fig. 1.

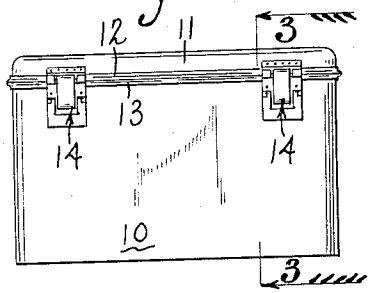


Fig. 2.

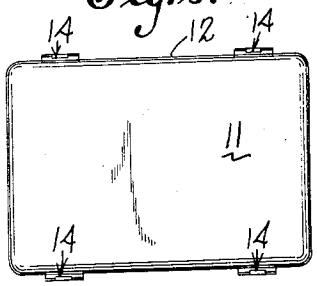


Fig. 3.

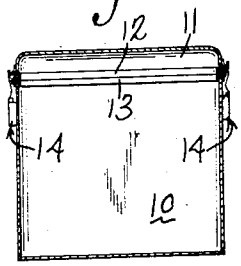


Fig. 4.

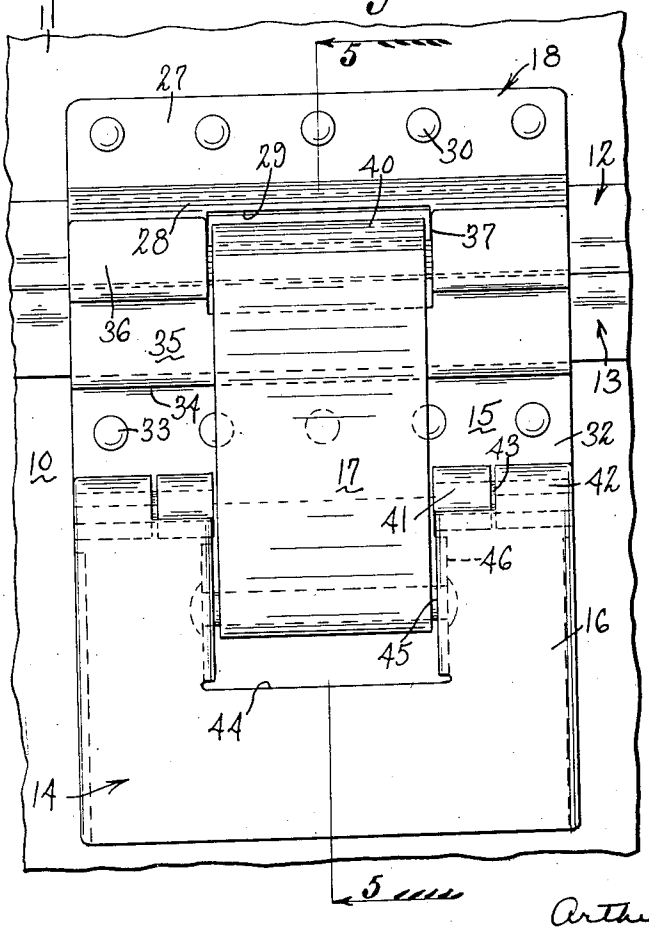
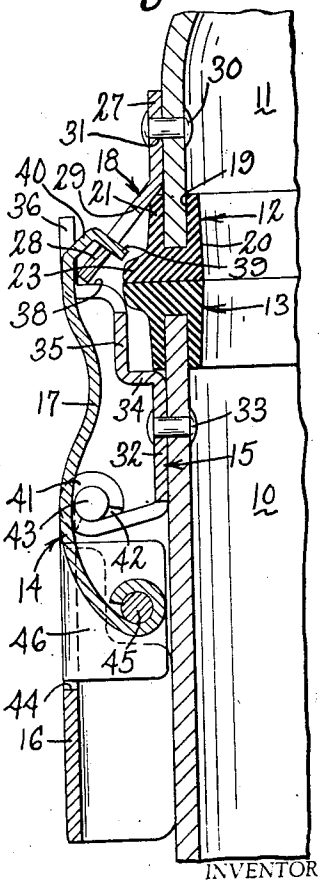


Fig. 5



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Fig. 6.

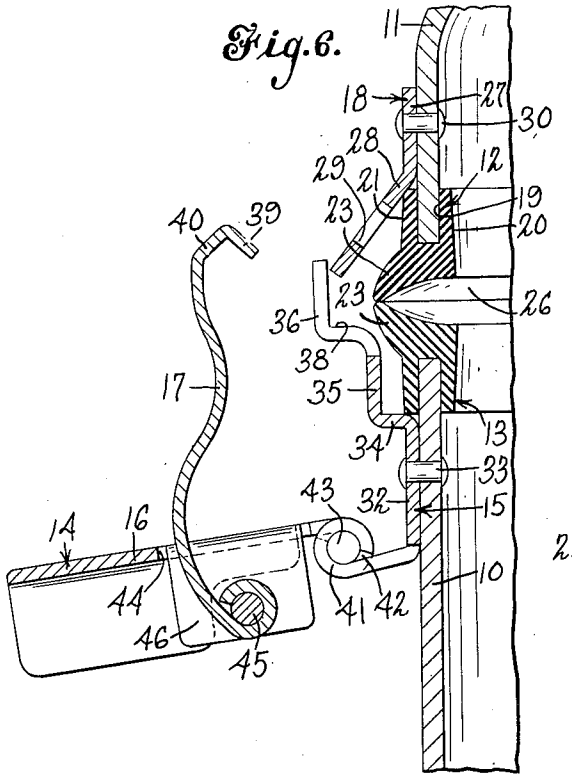


Fig. 7.

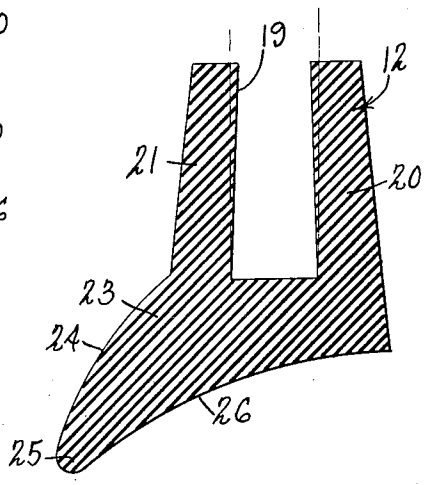


Fig. 8.

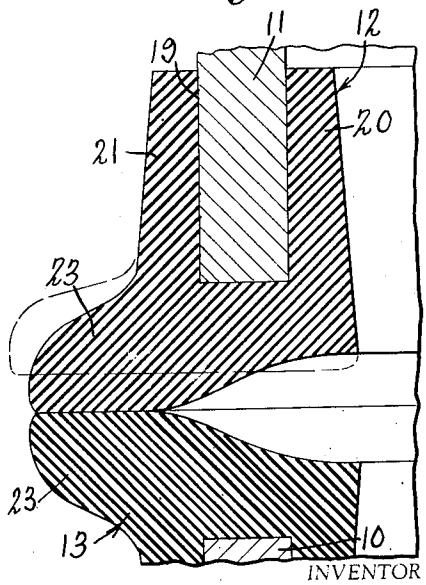
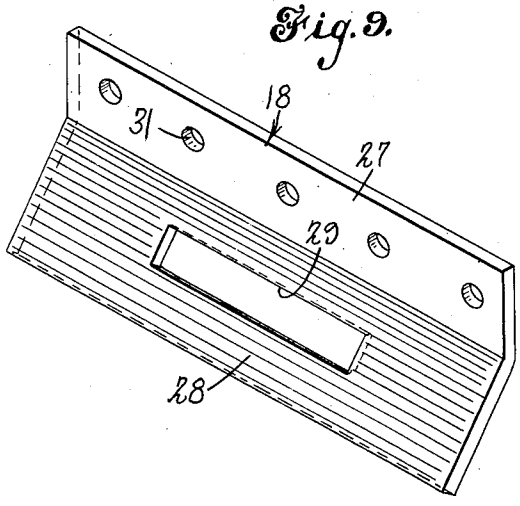


Fig. 9.



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CLOSURE MEANS FOR BOX LIDS

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Application October 23, 1953, Serial No. 387,842

6 Claims. (Cl. 220—46)

This invention relates to closure means for box lids and it has particular reference to a closure that will seal the joint between the body of the box and the cover or lid for the purpose of protecting the contents of the box from the effects of air, vapor, liquid and the like.

The invention relates especially to a closure involving gasket members which are carried respectively by the box body and the lid, said members being so formed and arranged and the other parts of the closure so organized that in the closed position of the box, the gasket members will be held in contact with each other to provide an effective seal.

An object of the invention is to furnish an effective and advantageous sealing means of this general type or character.

Another object is to provide an improved form and arrangement of sealing members in the nature of resilient gaskets carried respectively by the body and the lid.

A further object is to provide an improved closure means for boxes or containers in which, for creating a sealing effect, it is not necessary to provide strongly acting or powerful pressure instrumentalities such as heavy springs for exerting closing force on the lid and in which, nevertheless, a better seal is provided than heretofore.

Another purpose of the invention is to provide a closure in which the sealing effect will be substantially uniform throughout the length of the meeting edges of the parts so that at no point in the length of the meeting edges will there be leakage.

In the accompanying drawings:

Fig. 1 is a side elevation of a box embodying the invention, the cover or lid being fully closed;

Fig. 2 is a top plan view of the box;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is an enlarged elevation of a portion of the box structure shown in Fig. 1, showing one of the lid fasteners on a much larger scale;

Fig. 5 is a section on line 5—5 of Fig. 4;

Fig. 6 is a section similar to Fig. 5 showing the released position of the fastener;

Fig. 7 is an enlarged transverse section of the upper gasket member as it appears before application to the box structure;

Fig. 8 is a sectional view showing on a larger scale certain parts appearing in Fig. 6, the gasket members being in a condition where they are subjected to a somewhat greater pressure; and

Fig. 9 is a perspective view of the upper or keeper member of the fastener.

In the form shown in the drawings, the box or container is one in which the body and the lid are made of strong but relatively light and thin material such as fiber glass. For sealing the joint between the lid and the body, two elastic gasket members are employed, each one extending continuously along the edge of the box or lid, as the case may be. The corners of the box are rounded in plan, as generally indicated in Fig. 2, so that each

gasket can follow the contour of the part to which it is applied without creating sharp turns or corners in the gasket which might cause objectionable deformation of the cross-sectional shape. The box shown is one in which two fasteners for holding the lid on the body are used at one face and two other fasteners of the same structure as the first are employed at the opposite face. To open the box all the fasteners are released, which frees the lid so that it can be lifted and removed. In this form, the fasteners are of the toggle type having attaching plates applied to the box body and apertured keeper plates applied to the lid, the plates attached to the body having operating levers pivoted thereto and the operating levers having pivoted thereto catch levers shown as resilient metal members that engage the corresponding keeper plates. The engagement of the catch member with the keeper plate serves to maintain in sealing contact with each other gasket members applied to the respective members of the box structure. The gasket members in this form are applied to the respective box members by means of channeled parts of the gasket members into which the edge portions of the box members fit tightly, and these gasket members are provided, as hereinafter described, with resilient lip portions which are placed in contact with each other when the lid is placed on the box body and are somewhat deformed, as hereinafter described, when the lid fasteners are closed.

In the drawings, the box body is indicated at **10**, the lid at **11**, the gasket applied to the lid at **12**, the gasket applied to the body at **13**, the toggle fastener, as a whole, at **14**, the attaching plate attached to the box body at **15**, the pivoted operating lever at **16**, the resilient catch member at **17**, and the keeper member or plate applied to the lid at **18**.

Taking up first the gasket members **12** and **13**, it may be explained that it is advantageous to make these two members of identical form and dimensions and, in the present case, these members are identical, but in some instances, it may be advantageous to have them differ from each other in some respects. The upper member **12**, shown in detail in Fig. 7, may be taken as typical of these members and it will be noted that it has an upper channel **19** therein by means of which it is frictionally fitted over the edge of the corresponding box part. These gasket members can advantageously be made of resilient material such as rubber and it is advantageous to make them of neoprene rubber in view of the resistance of the latter to the action of oil, gasoline and the like. In the form shown in Fig. 7, the side members or walls of the gasket which provide the channel **19** normally have their inner faces arranged on sloping lines for effective holding of the gasket on the box member, and preferably also these walls will increase in thickness somewhat in a downward direction. The rear wall **20** extends downwardly beyond the channel and the forward wall **21** extends downwardly to a greater extent, being merged into a lip portion **23** that extends downwardly and also forwardly, the arrangement being such that under normal conditions, the cross-sectional shape of the gasket is as shown in Fig. 7, presenting a downwardly and forwardly directed lip of the formation shown.

The lip referred to projects forwardly and downwardly from the lower part of the wall **21** and from the part of the gasket which underlies the channel **19**, said lip having a convex forward surface **24** and a rounded lower marginal portion or tip **25**. The lip tapers or decreases in cross section toward the margin. At the lower surface of the lip is a slightly concave surface which is continued on and from the lip to the rear surface of the gasket, providing a continuous upwardly sloping concavity **26** at the lower part of the gasket. The concavity **26** is

drawn on a larger radius than the convexity **24**, the two converging toward the free margin of the lip.

By providing gaskets of this form, the effect may be as shown by example in the drawings, namely, that when the lid is placed on the box body, the lips of the two members will make contact with each other at their marginal or tip portions only, although by exerting further pressure on the lid the contact area may be increased to the extent shown by way of example in Fig. 8, and upon further force being applied by closing the fastener **14**, the two gaskets will be in full contact with each other across their lower parts, as shown in Fig. 5, to provide a very effective seal.

The fastener **14**, shown in the drawings, has an upper keeper member **18** of the form shown in Fig. 9, this being a plate having a relatively wide and shallow upper portion **27** integrally joined to a part **28** that is at an obtuse angle to the part **27** and is inclined downwardly and outwardly with respect to the box lid. This part has an elongated keeper aperture **29** adapted to be engaged by the hook part of the catch member **17**. This keeper plate is attached to the lid in a suitable manner as by rivets **30** extending through holes **31** in the plate portion **27** and through the wall of the lid at a location somewhat above the lower margin of the lid. It will be noted that in the form shown the arrangement is such that the part **28** of the keeper plate is closely adjacent the upper edge of the wall **21** of the adjacent gasket, the arrangement being such, as shown in Fig. 6, that the lower margin of the keeper plate is spaced forwardly with reference to the lip of the gasket member.

The plate **15** has the same width as the keeper plate and has the profile shown in Figs. 5 and 6, the lower part **32** thereof being attached to the box body by rivets **33** in a location below the upper margin of the box body. The plate portion **32** is joined integrally to a forwardly bent portion **34** and this portion is adjacent the margin of the forward wall of the lower gasket. The part **34** is integrally joined to an upstanding part **35** and this part is integrally joined to a forwardly offset plate portion **36** which is at the upper extremity of the plate **15** and provides an angle or seat in which the lower margin of the keeper plate can be received in the relationship shown in Fig. 5. The upper part of the plate **15** is cut away at **37** so that it is of fork formation and, as a result, the upper portion of the catch lever **17** can engage the keeper member in the manner shown in Fig. 5 in order to hold the lower margin of the keeper member in its seat. This seat which accommodates the lower margin of the keeper member is indicated at **38**.

The catch member **17** has its upper extremity bent to provide a tip portion **39** adapted to enter the keeper aperture **29** and lying at substantially right angles to an adjacent portion **40** of the catch member, the portions **39** and **40** providing a hook.

The lower part of the plate **15** has adjacent the lower margin integral forwardly bent knuckles **41** and the operating lever **16** has its upper marginal portion cut away and provided with knuckles **42** which are in line with the knuckles **41** and receive pivot pins **43** passing through the knuckles to provide for the pivotal mounting of the operating lever **16**. This operating lever in this form has the same width as the plates **15** and **18** and is cut away, as shown at **44**, to accommodate the lower end portion of the catch member **17**. The catch member is preferably of bowed formation, as shown in the drawings, and its lower end is curled over to receive a pivot pin **45** extending between rearwardly bent lugs **46** on the operating lever, whereby the operating lever and the catch member can have relative swinging movement.

The fastener operates on the toggle principle and, in the closed position, the parts have the positions as shown in Fig. 5, the upper extremity of the catch member holding the keeper member in its seat under some tension owing to the resilience of the catch member. On pulling the lower part of the operating lever in an outward direction, the fastener can be moved so that the catch member is raised to disengage the keeper.

To close the box, the lid is placed in position so that the gasket members will have marginal engagement with each other, as shown in Fig. 6. With a light-weight lid, the resting of the lid on the body will only slightly deform the gaskets from the initial cross-sectional shape shown in Fig. 7. To close the box, all fasteners are moved to their closed positions by engaging their catch members with the respective keeper members and moving the operating levers to the closed position. This will have the effect of pulling the lid downwardly to such an extent that the gasket members have full contact with each other substantially across the width, as shown in Fig. 5. In other words, there will be facial contact of the opposing parts of the gaskets substantially throughout the area of the opposing faces or portions of the gaskets. In moving the fasteners from the released to the latched positions, the gaskets will have their shapes pass through an intermediate stage such as shown in Fig. 8 where the lip portions are in full contact with each other across a substantial portion of the gasket width, although the inner parts of the gaskets are not yet in contact with each other. When the full pressure of the fastener is exerted each gasket will change from the shape shown in Fig. 8 to that shown in broken lines in this same view. It will be noted that in the initial shape of the gasket, the shallow concavity **26** extends substantially throughout the gasket width. However, on full pressure being exerted, the effect on the gasket is to deform it so that its inward portion is pushed downwardly to a degree, as shown by the broken line in Fig. 8, while the forward portion of the gasket is pushed upwardly, so that a substantially horizontal face is created. This applies to the upper gasket shown in Fig. 8, but it is understood that a similar deformation takes place in the lower gasket. The deformation is such that a substantially horizontal contacting and sealing face is provided substantially across the width of the gasket, which is considerably greater than that of the box wall.

It is to be noted that the sealing of the container is brought about by effecting contacting relationship between lip-equipped gasket members and bringing about a full or substantially full face-to-face contact of these members at their opposing parts through deformation of these elastic members. Relatively light pressure is required to accomplish this. The only force required is a light force to deform the gaskets and hold them under sufficient pressure to provide a seal, the latter pressure, owing to the character of the gaskets, being a relatively light pressure. The function of the fasteners is to provide the relatively light pressure which is required and to hold the lid on the body. Beyond this, the function of the fasteners is to maintain the positioning of the upper gasket in a horizontal plane with respect to the lower gasket. The lid on the box body being brought into a relationship where the upper and lower gasket members are in correct alignment or registry, and the relatively light pressure (in addition to the weight of the lid) being applied by the fastener, all that is required is the maintenance of the relative lateral and longitudinal positions of the members. This is accomplished by providing fasteners such as herein shown. Each has a keeper member on the lid engaging a seat provided on or in connection with the box body to prevent outward lateral movement of the lid relatively to the body. Referring to Fig. 5, for example, the lid in this latched position cannot be moved to the left and, as there is a similar arrangement at the opposite side of the box, the lid cannot be moved to the right. Endwise movement of the lid is prevented by the engagement of the catch members with the keeper members. The contacting relationship between the gasket members is sufficient to seal the box and this is maintained so long as the lid and body are

held together by the fasteners. The cooperating parts of each fastener are located laterally outwardly of the gasket members, the gasket members extending continuously past the under or rear parts of the fastening assemblies.

It will be seen from the foregoing that in a container having sealing means constructed and arranged as described, the sealing action, which is very effective, is brought about to a large degree by the deformation of upper and lower gasket members which are elastic and deformable under relatively light pressure to cause the creation of contacting sealing surfaces of adequate area which are smooth and of good sealing material and are held in close contact with each other. More especially, the invention provides a gasket member for the described purposes provided with a body portion and projecting from the body portion as a part thereof a flexible elastic readily bendable and deformable member in the nature of a lip, which lip preferably extends from the gasket body in a forward direction with respect to the container and has a profile and action such as described above. The lips or like members of the gaskets are movable and deformable to extend the contacting area of the two gasket members, each lip or like member having in the closed position of the container a displaced position and tending to return by its inherent elasticity to the initial shape, such tendency serving to press a part of one gasket against a part of the other and thereby increase the sealing effect of the gaskets. For a box such as shown in the drawings, four fasteners, arranged in the manner shown, will be sufficient for achieving the desired sealing effect at all points in the joint between lid and body. There is no limitation, however, to any particular number of fasteners as this may be changed as conditions require.

It is evident that the gaskets carried by the lid and box elements have opposed surfaces normally located in planes out of parallel relationship to each other and that under the action of the fasteners these surfaces are brought into contact with each other and into substantially parallel relationship, as shown in Fig. 5.

The invention provides a relatively simple and inexpensive closure means well adapted to provide a tight and secure seal for protecting the contents of the box or other container from the effects of air, vapor, gas, liquid, and the like. The gasket members are of relatively simple form, but their structure is such as to supply the gasket with valuable additional functions. Such gaskets can be readily made, for example, by the employment of well known molding processes. There are provided with the gaskets suitable fasteners for holding the lid to the box body and maintaining the lid and box body in correct alignment or registry, such fasteners being applied to the external faces of the body and lid and so arranged as not to interfere in any way with the gaskets, which, in part, are disposed between the face of the box and the rear part of the fastener structure in an appropriate space such as shown, for example, in Fig. 5. In some cases discontinuous rather than continuous gasket members may be employed.

The present disclosure is by way of example only and it is to be understood that various modifications and changes in the details can be made within the scope of the claims.

What I claim is:

1. In a box structure having a body and a lid approachable toward each other in a straight line, a keeper plate applied to the lid and having an apertured part extending downwardly and outwardly from the lid, an attaching plate applied to the body below the keeper plate having a body portion provided with an upper angular seat positioned outwardly of the box wall at a distance therefrom and adapted to be engaged by the lower margin of the keeper plate, an operating lever pivoted to the lower part of said attaching plate and

having pivoted thereto a resilient catch lever provided with an upper end engageable with the aperture of the keeper plate to position the keeper plate in said seat, and deformable gaskets of elastic material applied to the lid and box body at their adjacent edges and having opposing deformable sealing surfaces adapted to contact and conform to each other in a straightline including surface portions of concave shape formed on lip portions of said gaskets which are extended forwardly from the box structure in a space located rearwardly of the seat in which the keeper plate is engaged.

2. In a box structure, body and lid elements approachable in a straight line having opposing edge portions, gasket members having portions conforming to and fixed to said edge portions, said gasket members having at their adjacent parts forwardly and angularly projecting deformable lip portions and having contact surfaces partly on said lip portions and partly on the bodies of the gasket members adapted to be brought into contact and substantial parallel relationship by pressure exerted on the lid, the lip portions making first contact and the body portions completing the contact of a seal on application of more pressure, and a fastener applied to the box wall adapted to apply the requisite pressure to the lid and having a positioning seat for the lid spaced outwardly from the box wall and over and in line with a part of the lip portions and clearing said part, said fastener deforming the sealing parts on the bodies of the gasket members as well as the sealing parts on the lip portions, the seal being a straight-line seal of substantially greater width than the thickness of the adjacent parts of the body and lid.

3. A box structure having lid and body elements of substantially equal thickness approachable toward each other in a straight line, the lid element having a depending wall to align with a wall of the body element, said elements being equipped at their adjacent edges with meeting deformable gaskets of elastic rubbery material having opposed surfaces to contact with each other over an area wider than the thickness of said elements and said surfaces normally standing in planes out of parallel relationship, said opposed surfaces including surfaces provided on the bodies of the gaskets in line with said depending wall and other surfaces provided on lips projecting outwardly from the box and laterally and angularly from the gasket bodies, and fasteners disposed in locations around the box bridging the gaskets and having parts interengaging in locations outwardly of said lips for exerting pressure on the lid element and holding the gaskets in sealing relationship, the lips of the gaskets making first contact on approach of said elements, and the fasteners, on further pressure being exerted, bringing the lips and the bodies of the gaskets into substantially straight-line contact across the width of the gaskets.

4. A box structure having lid and body elements of substantially equal thickness approachable toward each other in a straight line, the lid element having a depending wall to align with a wall of the body element, said elements being equipped at their adjacent edges with meeting deformable gaskets of elastic rubbery material having opposed surfaces to contact with each other over an area wider than the thickness of said elements and said surfaces normally standing in planes out of parallel relationship, said opposed surfaces provided partly on the bodies of the gaskets and partly on lips projecting outwardly with respect to the box and laterally and angularly from the gasket bodies, said surfaces on the bodies and lips of a gasket normally following a concave curve substantially across the width of the gasket, the two lips making first contact on approach of the lid and body of the box and the body portions of the gaskets on further approach contacting to provide a substantially straight-line sealing contact across the width of the gaskets, and fasteners disposed in locations around the box for holding the gaskets in sealing relationship, each fastener being

disposed in bridging relationship to a gasketed portion and comprising an upper keeper on the lid, a bracket-like plate applied to the box body having an outstanding angular seat to accommodate an outstanding part of the keeper, and a resilient catch lever engaging the keeper to hold it firmly seated at a predetermined level in the height of the box.

5. In a box structure, body and lid elements approachable by lowering of the lid element and having upright walls in line with each other provided with opposing edge portions, gaskets of elastic material applied to the lid and body at said opposing edge portions, said gaskets having bodies in opposition and integral forwardly and angularly projecting lip portions extended forwardly from the box, said bodies and lip portions providing in conjunction contact surfaces on the gaskets of substantially greater width than the thickness of the box wall, the contact surfaces being normally out of parallelism but capable of being brought into parallelism and full sealing contact by application of pressure to the lid, the lip portions on closing of the lid making first contact and the bodies making contact on application of further pressure, and a fastener for holding the box body and lid against lateral displacement and holding the gaskets in full seating contact applied to the box wall and clearing the forwardly extended lip portions of the gaskets, said fastener having a bracket-like seating member on the box element and a keeper member on the lid which in the closed position of the fastener is seated in said seating member.

6. A box structure having relatively thin lid and body

elements provided with aligned walls having meeting edges, said elements being equipped at said edges with deformable gaskets of elastic rubbery material having opposed surfaces to contact with each other over a sealing area wider than the thickness of said elements, said opposed surfaces normally standing out of parallelism with each other and disposed partly on the bodies of the gaskets and partly on lips projecting outwardly from the gasket bodies and the box, and a fastener for applying sealing pressure to the gaskets and holding them in sealing relationship, said fastener being disposed in bridging relationship to the gaskets and comprising a keeper on the lid, a bracket-like plate applied to the box body having a seat to receive an outstanding part of the keeper, and a catch lever engaging the keeper to hold it firmly seated.

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