Aug. 27, 1968 R. W. MacDONNELL 3,399,005

JOURNAL BOX LID SEAL

Filed Jan. 30, 1967 2 Sheets-Sheet 1

Fig. 1.

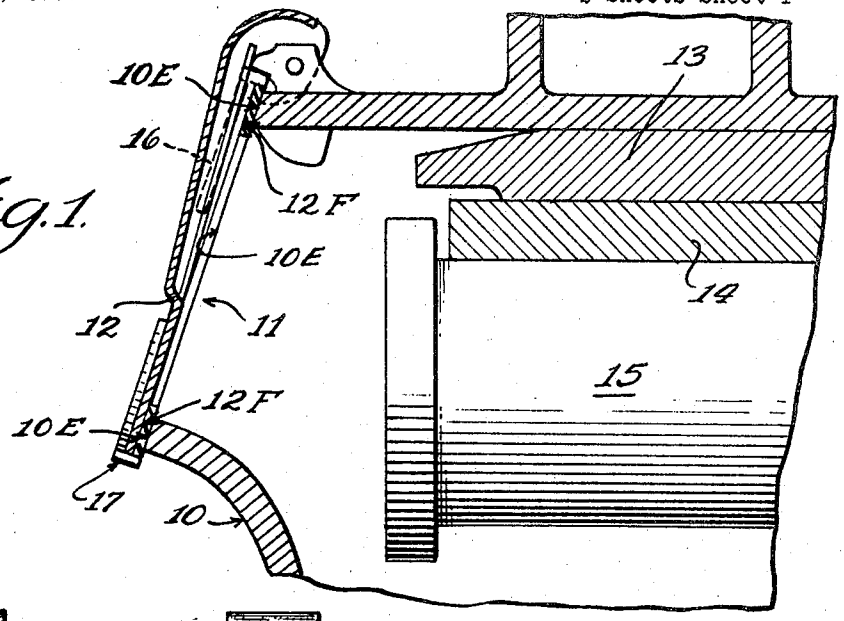


Fig. 2.

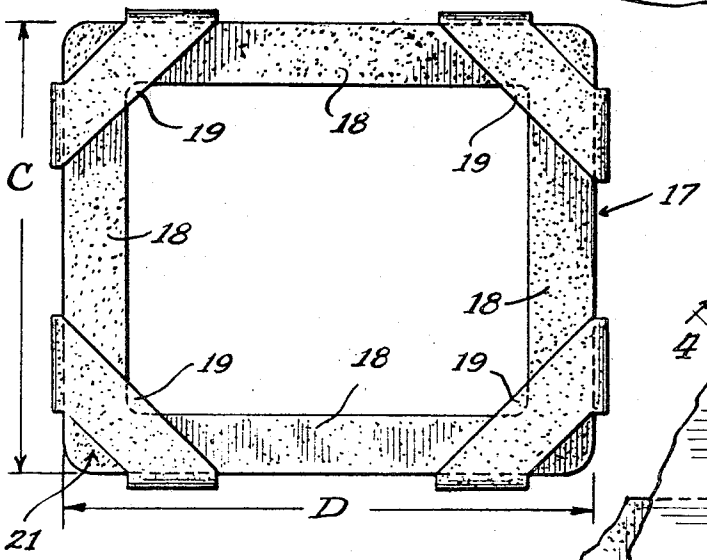


Fig. 3

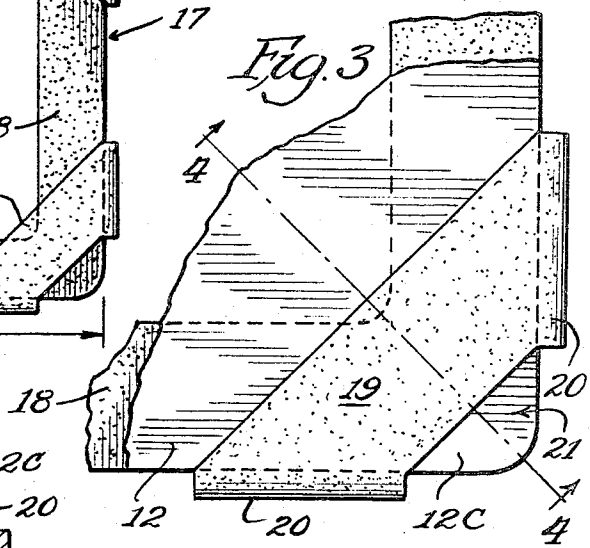
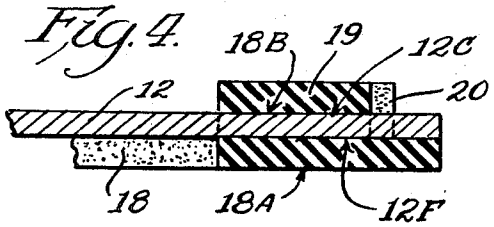


Fig. 4.



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Aug. 27, 1968 R. W. MacDONNELL 3,399,005

JOURNAL BOX LID SEAL

Filed Jan. 30, 1967 2 Sheets-Sheet 2

Fig. 5.

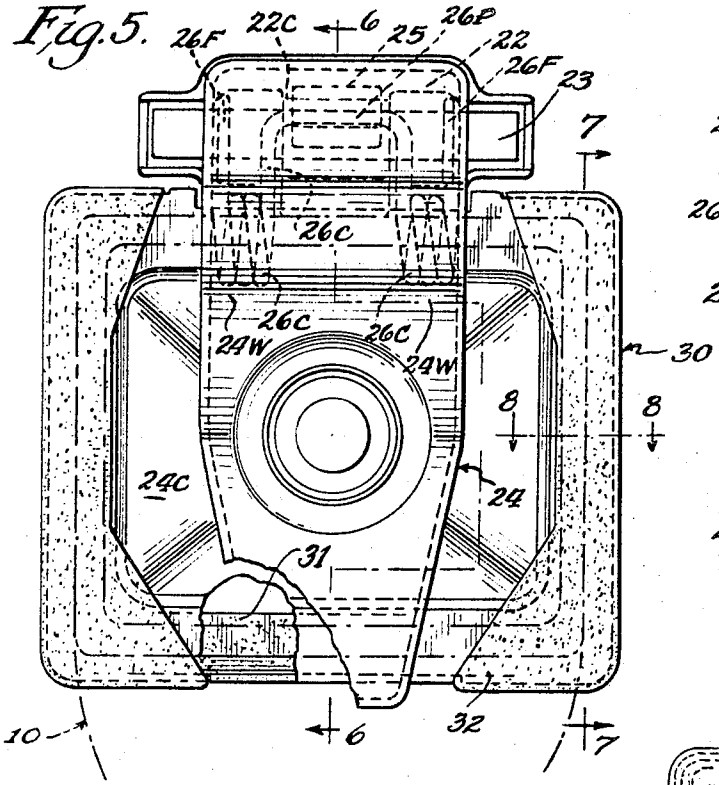


Fig. 6.

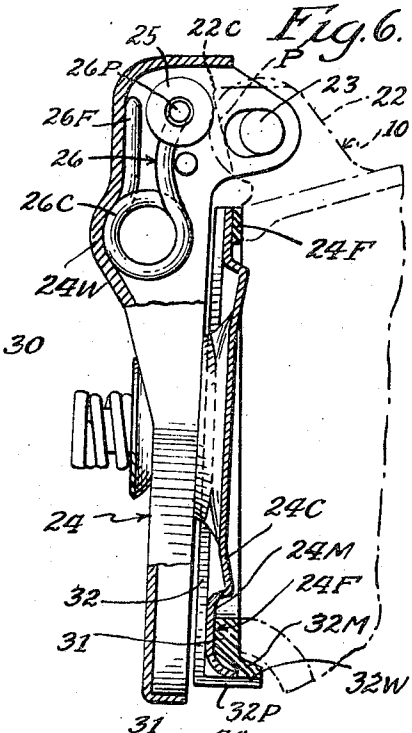


Fig. 9.

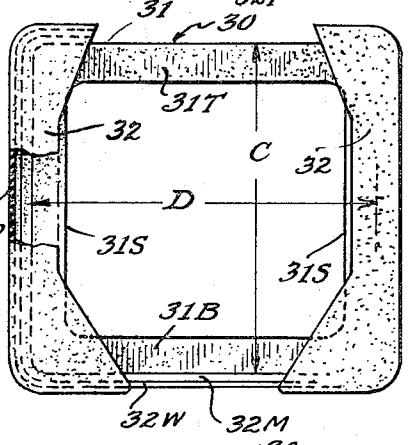


Fig. 8.

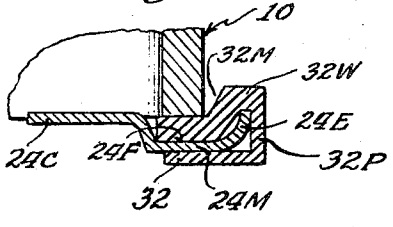


Fig. 10.

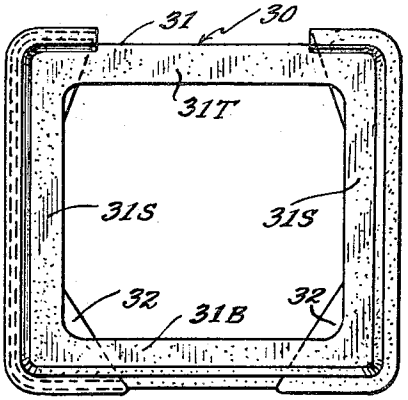
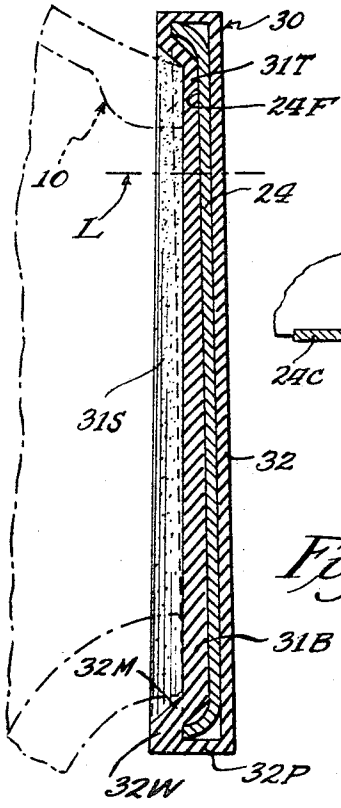


Fig. 7.



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JOURNAL BOX LID SEAL

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Filed Jan. 30, 1967, Ser. No. 612,525
15 Claims. (Cl. 308—44)

ABSTRACT OF THE DISCLOSURE

A journal box lid seal of one piece rubber-like material in the shape of a rectangular frame and having corner pockets engageable on the lid corners to seal the frame. The seal frame is slightly smaller than the lid to be stretch mounted on the lid.

This invention relates to a seal for piggy-back mounting on the standard lid employed with the conventional railway car journal box and, more particularly, the invention is concerned with a one piece rectangular frame of elastomeric material which is stretch mounted upon the lid to be engageable in sandwiched relation between the outer end of the journal box and the marginal inside face regions of the lid.

The conventional railway car journal box has a generally rectangular outer end providing an access opening to the box for replenishing the supply of oil as well as for general inspection and maintenance purposes. To insure proper lubrication of the journal, it is desirable that the lid be effectively sealed in spanning relation across the access opening in a fashion to prevent loss of oil and prevent ingress of dust or other foreign matter. Seals for this purpose are known and seals mounted on the lid for this purpose are also known. In addition, a number of special purpose combination lid and seal assemblies have been devised but these special designs require an entirely new lid structure. In the prior art arrangements, the lid seals have used separate mechanical fastening elements and have been found to be subject to breakage incident to normal opening and closing of the lid associated with routine maintenance operations.

The lid is hingedly mounted on the top of the journal box and a lid spring normally acts to pressure load the lid towards the open end of the journal box to prevent flapping or rattling of the lid during train movement. The AAR (American Association of Railroads) has established standards specifying the range of pressures which must be maintained by the lid spring and this imposes constraints upon the space occupied by the seal so that the thickness of the seal element must be suitably restricted. In the prior art, the lid seals have been of greater thickness to enhance sealing and this together with the use of mechanical fasteners increases the seal space problem.

The present invention provides a one piece lid seal which requires no separate mechanical fasteners, which is weather resistant and which is lower in cost and easier to manufacture. The lid seal of this invention is reuseable and may easly be mounted and removed from a standard journal box lid. The mounting relationship for the seal is such that it is not in the way of the lid hook used for prying open the lid in normal maintenance and inspection operations. In the disclosed embodiments, a one piece lid seal in the form of a rectangular frame of elastomeric material is provided with integral strap portions at the corners to define mounting pockets which contain the corners of the lid to mount the seal in stable piggy-back position upon the lid, with its frame portion overlying marginal inside face portions of the lid. The seal, as fabricated, is slightly undersize in relation to the lid and

is stretched in place upon the lid so that the frame is maintained under limited tension at all times during normal use.

Conventional journal box lids come in a range of sizes and the seal of this invention may be selected to fit more than one lid size, the seal is sized to be in a slightly stretched condition when mounted upon the smallest lid for which it is intended. The elastomeric material of the frame has a stretch ratio great enough to enable mounting of the seal on the largest lid without exceeding the elastic limit of the frame material. The limited tension acting upon the frame by virtue of its stretch mounting upon the lid insures that the frame lies flat along the marginal inside face regions of the lid. This flat configuration insures positive sealing because buckling or rippling such as could be occassioned by lid size variations is eliminated and because the tendency of the frame material to relax or sag upon extended exposure and weathering is compensated. In addition, the flatness in the seating of the frame minimizes the effective seal thickness problem and precludes departures from the required lid spring pressure ranges.

Other features and advantages of the invention will be apparent from the following description and claims, and are illustrated in the accompanying drawings which show structure embodying features of the present invention and the principles thereof.

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

FIG. 1 is a fragmentary vertical section illustrating a conventional railway car journal box arrangement having a standard lid hinged thereon and shown equipped with a seal in accordance with this invention;

FIG. 2 is an elevational view of the seal;

FIG. 3 is an enlarged fragmentary elevational view of a corner region of the seal and showing the same embracing a lid corner region;

FIG. 4 is a section taken as indicated on the line 4—4 of FIG. 3;

FIG. 5 is a front view of a journal box and lid and shows another embodiment of lid seal;

FIGS. 6, 7 and 8 are fragmentary sections taken on the lines 6—6, 7—7 and 8—8, respectively, of FIG. 5;

FIG. 9 is a front view of the lid seal of FIG. 5, partly broken away and sectioned; and

FIG. 10 is a rear view of the lid seal.

Referring now to the drawings and particularly to FIG. 1, a conventional journal box is designated generally at **10** and has a front end provided with an access opening **11** which normally is spanned and closed by a standard journal lid **12** which is hingedly mounted to the box to swing about a pivot axis defined on the top of the box. The box **10** receives the usual wedge **13** and bearing brass **14** which support the railway car truck on the end of a journal **15** which extends into the box, all in accordance with standards established by the AAR. The lid **12** for the box is also standardized in accordance with AAR specifications and will be any of the following standard sizes in accordance with the box size, 5 x 9, 5½ x 10, 6 x 11 or 6½ x 12 (all measurements being given in inches). A leaf spring **16** of conventional form reacts between the box **10** and the lid **12** normally to urge the lid in a box closing relation spanning the access opening **11** and sealing against box end portions **10E** bordering the access opening.

In accordance with this invention, a seal **17** is mounted in piggy-back relation upon the lid **12** to seat in sandwiched relation between the box end portions **10E** that border the access opening and the marginal inside face portions **12F** of the lid. The seal **17** is a one piece unit

of elastomeric material, for example, a closed cell neoprene rubber or an acrylic rubber. On such suitable material is marketed under the trade name Nitrile by Du Pont.

As is best seen in FIG. 2, the seal **17** comprises a continuous rectangular planar frame portion **18** to overlie the marginal inside face portions **12F** of the lid and integral strap portions **19** joined to and spanning corner regions of the frame in outwardly offset relation to the plane of the frame to overlie outside corner face portions of the lid **12C**. Each strap portion **19** obliquely spans the corresponding corner region of the frame and is endwise joined, as indicated at **20**, to outer peripheral extremities thereof to define corner pockets which receive the corner regions of the lid. These pockets, in the form illustrated herein, are open at the corner apex region **21** but a closed pocket construction is also contemplated in accordance with this invention.

A seal having a cut-out corner arrangement, as disclosed herein, is easier to apply and is not subject to corner puncture such as might occur with a closed pocket construction. The frame **18** is itself flat and of substantially uniform thickness and presents continuous seal faces **18A** and **18B** to contact the box and the lid, respectively. These seal faces **18A** and **18B** may be smooth or ribbed. The frame **18** as applied to the lid **12** is in a stretched condition and limited tension acts along the legs of the frame so that the frame is maintained flat and is not subject to buckling or rippling due to minor lid size variations or due to any tendency of the seal material to relax or sag. Only a slight stretched condition is required for achieving the flatness for improved sealing and it is desirable that the stretch be slight for the minimum size lid in order that the same seal may be used on the immediately larger size of lid.

By way of example, where a seal is provided in accordance with this invention to fit either the 5 x 9 or the 5½ x 10 size lids, the frame width, as indicated by dimension D in FIG. 2, is 9¼ inches and the frame height, as indicated by dimension C in FIG. 2, is 7⅞ inches. The width of each leg of the frame is 1 inch and the thickness of each leg is 3/16 of an inch. The oblique strap portions **19** may be 1 inch in width and 3/16 inch in thickness and they are offset from the plane of the frame by ¼ inch to define the pockets which receive the corners of the lid.

There is advantage in utilizing a seal frame of minimum thickness in order that the specifications for lid closing pressure required to be established by the springs may be met. The present seal is thinner than seals currently in use and yet seals as well or better by virtue of the limited tension acting on the frame as a result of the stretch mounting.

Another lid seal embodiment is illustrated at **30** in FIGS. 5 to 10 wherein a journal box, as again designated generally at **10**, carries a hinge lug **22** to receive a hinge pin **23** that mounts the lid **24**. The hinge lug **22** has a cam surface **22C** engageable with a roller **25** to determine the spring force acting to hold the lid **24** against the end of the journal box **10**.

The lid **24** is equipped with a spring **26** having coaxial coiled sections **26C** connected by an intermediate portion **26P** that carries the roller **25**. The coiled sections **26C** are nested against offset wall portions **24W** of the lid and terminate in upwardly directed straight free ends **26F** that react against the lid. The point at which the roller **25** engages the cam surface **22C** determines the force with which the lid is urged towards the end of the journal box. In the absence of a lid seal, the bearing face **24F** of a conventional lid **24** which is swingable about the axis of the hinge pin **23** will engage in flush relation against the entire periphery of the end of the journal box **10**. For this condition, the roller **25** will engage the cam surface **22C** at some point P shown in FIG. 6.

Where a lid seal **30** is provided to be compressed between the lid and the end of the journal box, the swing of the lid is foreshortened by the thickness of the seal so that the roller **25** engages the cam surface **22C** at a location above the point P and the spring is acting with an increased force. Moreover, if the lid seal is of uniform thickness at all regions between the end of the journal box and the lid bearing surface **24B**, the top web of the seal is first to be contacted and undergoes substantial compression before the lid can contact the bottom web of the seal. For these reasons, the prior art lid seals have encountered difficulty in meeting the spring force limitations established in AAR specification **M–120–60** pertaining to operating requirements for journal box lids and lid seals. Particular difficulty exists with the AAR requirement that the spring force acting at the closed position be within certain prescribed maximum values.

It will be seen from an inspection of the drawing figures that the conventional hinge lid **24** has a main cover **24C** provided with an outwardly offset marginal portion **24M** which terminates in an inwardly curving edge **24E**. The offset marginal portion **24M** presents the bearing face **24F** which is to press the seal against the end of the journal box.

The lid seal **30** is a one piece unit of elastomeric material mounted in piggy-back fashion upon the lid **24**. The seal **30** includes a continuous rectangular planar frame portion **31** to overlie the bearing face portions **24F** of the lid. The frame portion **31** has a top web **31T**, side webs **31S** and a bottom web **31B**. The bottom web **31B** is about 3/16 inch thick, the top web **31T** and upper regions of the side webs **31S** to approximately the region indicated at the line L in FIG. 7 is about ⅛ inch thick and the remaining regions of the side webs **31S** taper gradually from 3/16 inch thickness at the bottom to ⅛ inch thickness at the line L. Thus, as best seen in FIG. 7, the tapered side webs **31S** present an angled plane to the bearing face **24F**, the plane being substantially aligned with the axis of the hinge pin **23**, to enable flush seating and substantially evenly distributed compression at all points about the end of the journal box.

The frame has integral strap portions **32** to overlie the side webs **31S** and at upper and lower extremities to overlie and extend around the corner regions of the frame. Each of these strap portions **32**, as best seen in FIG. 8, includes an outer peripheral wall **32P** which merges with an inwardly offset wall **32W** which merges with an inner marginal wall **32M** that extends obliquely to join a rear perimetral region of the flat frame **31**. These walls define a pocket along each side web and around each corner and the pocket terminates in a tapered inwardly directed region to receive the inwardly curving edge of the lid.

The overlapping strap portions are not provided along the top and bottom webs **31T** and **31B** to allow the seal to be stretched widthwise for inserting it upon the lid. The bottom web **31B** is provided with the oblique inner marginal wall **32M** and the inwardly offset wall **32W** in the illustrated seal **30**. The dimensioning of the webs **31T** and **31B** is such as to necessitate stretch fit mounting holding these webs under tension and flush against the lid. Thus, the seal shown at **30** has a matching pocket contour to receive the marginal portion **24M** which presents the bearing face **24F** and to receive the curved edge **24E**, all in a snug fit relation whereby the frame portion **31** of the seal may nest in smooth flush relation to the bearing face **24F**.

The seal dimensions for a seal used on a 9 inch or 10 inch size conventional lid **24** are given with reference to FIG. 9. The frame width, as indicated by dimension D in FIG. 9, is 8¾ inches and the frame height, as indicated by dimension C, is 7½ inches. The width of each web of the frame is ⅞ inch. The overlapping strap portions **32** are ⅛ inch thick and are offset from the frame about ⅛ inch to provide adequate mounting clearance for receiving the cover section of the lid. The total depth of the seal, as measured at the wall **32P**, is about ¾ of an inch.

What is claimed is:

1. In a combination of a journal box, lid and seal wherein said seal is mounted in piggy-back relation upon the lid to seal in sandwiched relation between the lid and the box, said seal being a one piece unit of elastomeric material and comprising a continuous rectangular planar frame portion to overlie marginal inside face portions of the lid, and integral strap portions joined to and spanning corner regions of the frame portion in outwardly offset relation to the plane of the frame portion to overlie outside corner face portions of the lid and define corner pocket regions for containing the lid corner regions in a relation to maintain the frame portion flat against the marginal inside face regions of the lid.

2. A seal in accordance with claim 1 and wherein each of said strap portions extends obliquely across the corresponding corner region of the frame and terminates short of the extremity of such corner region to provide an outwardly open pocket.

3. A seal in accordance with claim 1 and wherein said frame portion is slightly smaller than said lid to necessitate stretch mounting of the frame portion along each length thereof.

4. A seal in accordance with claim 1 wherein said frame portion has vertical side webs and said integral strap portions extend full length in overlapping relation along the side webs.

5. A seal in accordance with claim 1 wherein said frame portion has vertical side webs tapering from maximum thickness adjacent the bottom to minimum thickness adjacent the top.

6. A seal in accordance with claim 1 wherein said frame portion has vertical side webs tapering from maximum thickness adjacent the bottom to minimum thickness adjacent the top and said integral strap portions extend full length in overlapping relation along the side webs.

7. A seal in accordance with claim 6 wherein said frame portion has top and bottom webs slightly shorter than the lid to necessitate stretch mounting of the frame along both the top and bottom webs.

8. In a lid and seal combination in accordance with claim 1 wherein said lid has a cover plate including an outwardly offset marginal section presenting said marginal inside face portions, said marginal section terminating in an inwardly curving edge and wherein said integral strap portions include outer perimetral wall portions leading first inwardly, then laterally and then outwardly to join the rectangular frame portion and define a perimetral pocket that receives the curving edge in a relation to permit the frame portion to lie flush against said face portions on the offset marginal section of the lid.

9. In a lid and seal combination in accordance with claim 1 wherein said lid has a cover plate including an outwardly offset marginal section presenting said marginal inside face portions, said marginal section terminating in an inwardly curving edge and wherein said frame portion has vertical side webs tapering from maximum thickness adjacent the bottom to minimum thickness adjacent the top and said integral strap portions extend full length in overlapping relation along the side webs, said frame portion having top and bottom webs slightly shorter than the lid to necessitate stretch mounting of the frame along both the top and bottom webs, said integral strap portions including outer perimetral wall portions leading first inwardly, then laterally and then outwardly to join the rectangular frame portion and define a perimetral pocket that receives the curving edge in a relation to permit the frame portion to lie flush against said face portion on the offset marginal section of the lid.

10. In the combination of a journal box having a generally rectangular outer end providing an excess opening to the box, a lid hingedly mounted to the top of the box and swingable towards the outer end of the box to span said opening and a seal mounted in piggy-back relation upon the lid to seal in sandwiched relation between box end portions bordering said opening and marginal inside face portions of the lid, said seal being a one piece unit of elastomeric material and comprising a continuous rectangular planar frame portion overlying said marginal inside face portions of the lid, and integral strap portions endwise joined to and obliquely spanning corner regions of the frame portion in outwardly offset relation to the plane of the frame portion to define corner pocket regions that receive corner regions of the lid in a relation to maintain the frame portion flat against the marginal inside face regions of the lid.

11. In a combination as defined in claim 10 and wherein each of said strap portions extends obliquely across the corresponding corner region of the frame and terminates short of the extremity of such corner region to provide an outwardly open pocket wherein the corresponding lid corner extends into outwardly exposed relation.

12. In a combination as defined in claim 10 and wherein said frame portion is slightly smaller in width than overlapping regions of said lid to provide widthwise stretch fit mounting of said frame portion on said lid.

13. In a combination as defined in claim 11 and wherein said frame portion has a maximum thickness of about 3/16 of an inch.

14. In a combination as defined in claim 10 wherein said lid has a cover plate including an outwardly offset marginal section presenting said marginal inside face portions, said marginal section terminating in an inwardly curving edge and wherein said integral strap portions include outer perimetral wall portions leading first inwardly, then laterally and then outwardly to join the rectangular frame portion and define a perimetral pocket that receives the curving edge in a relation to permit the frame portion to lie flush against said face portions on the offset marginal section of the lid.

15. In a combination as defined in claim 10 wherein said frame portion has vertical side webs tapering from maximum thickness adjacent the bottom to minimum thickness adjacent the top and said integral strap portions extend full length in overlapping relation along the side webs.

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