

Sept. 5, 1967

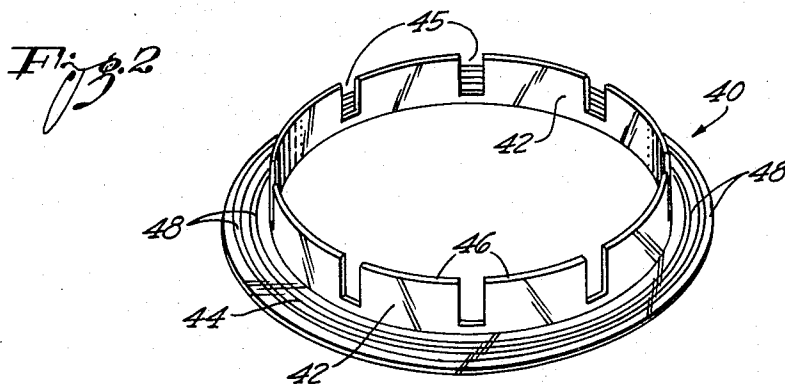
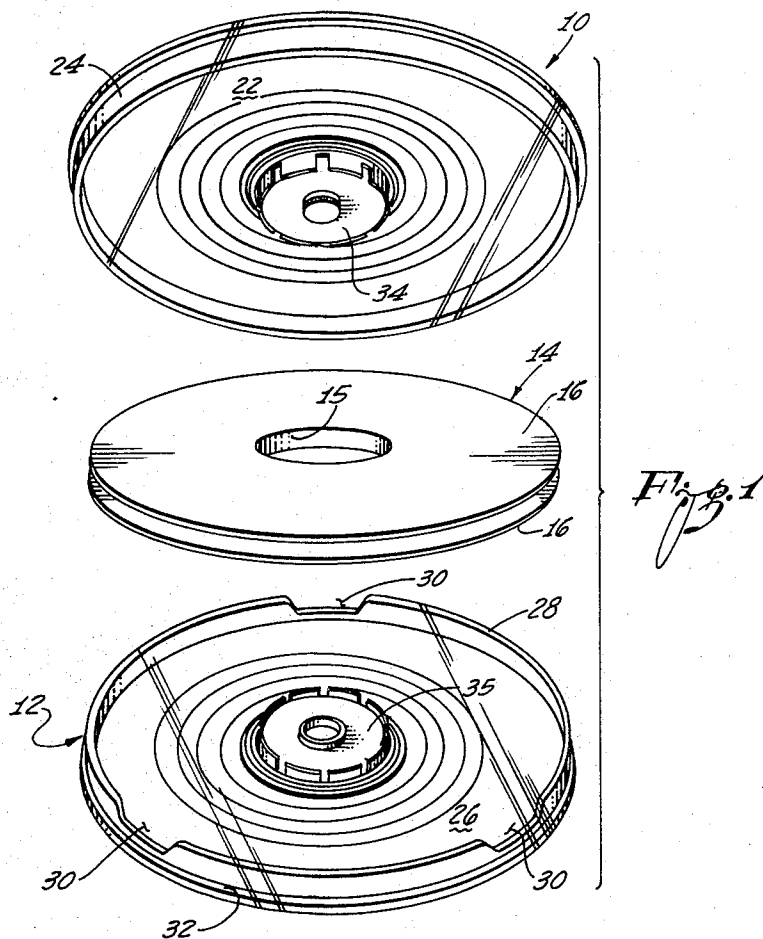
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3,339,718

REEL CASE

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2 Sheets-Sheet 1



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Fig. 3

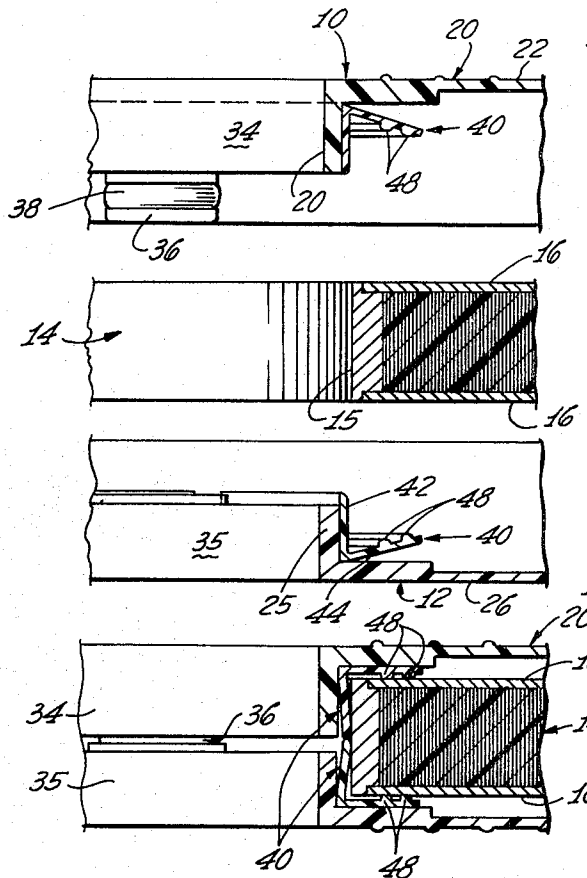


Fig. 4

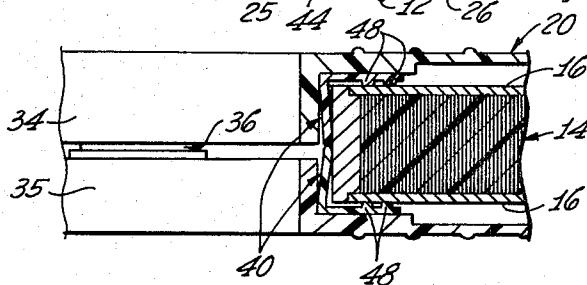
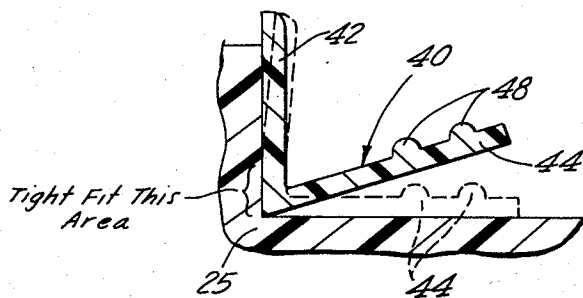


Fig. 5



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3,339,718

REEL CASE

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ABSTRACT OF THE DISCLOSURE

This disclosure describes a retainer for use within a reel container. The reel container includes two complementary case sections each of which has an inner hub flange which is receivable within the hub opening of a reel of tape. The retainer includes two resiliently flexible ring members each of which has a generally cylindrical portion and a disk portion which intersect to form an acute angle in radial cross-section when the ring member is unrestrained. Closing of the container with the reel of tape therein forces the disk portion toward a radial wall of the container and flexes a portion of the cylindrical portion radially outwardly to flexibly grip and retain the reel.

This invention relates to a case for a reel of tape or the like wherein the casing is made in two complementary releasably interlocking sections and, more particularly, the invention relates to a pair of ring members to cooperate with the two sections of the case, respectively, to serve both as spacer means and as retaining means between the case and the enclosed reel.

In a case of this particular type, each of the two complementary sections of the case has an inner circumferential hub flange to fit into the hub opening of the reel, a radial wall to cover the corresponding side of the reel and an outer cylindrical flange to encircle the periphery of the reel. The outer cylindrical flange of one of the two case sections makes edgewise contact with a sealing gasket in a corresponding circular groove in the other section. In addition a pair of elastomeric rings is usually provided for the two sections, respectively, each ring embracing the inner circumferential flange of the section in contact with the adjacent radial wall of the section.

A common means to releasably interlock the two case sections is a manual rotary latch means made in two parts which are mounted inside the two inner hub flanges of the two case sections, respectively. When the two sections of the case are drawn together into interlocking relationship by the rotary latch means, the outer circumferential sealing gasket is placed under pressure to seal the outer circumferential region of the case and the two inner circumferential elastomeric rings are placed under compression between the reel and the two case sections, respectively, to seal the inner circumferential region of the case. In addition the inner circumferential rings serve as spacer means to eliminate play between the case and the enclosed reel.

One disadvantage of using elastomeric rings in this manner is that in the course of time small particles fall away from the surfaces of the two rings to become troublesome foreign particles inside the case. Another disadvantage is that the elastomeric rings tend to become permanently deformed in the course of time with consequent reduction of their efficiency both as sealing means and as spacing means. A further disadvantage is that elastomeric material commonly tends to deteriorate by oxidation in the course of time.

The invention meets this problem by making the two ring members of a suitable inert, resiliently flexible plastic material such as nylon, polytetrafluoroethylene or a suitable grade of polyester, and by depending on the re-

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silient resistance to flexure of such a plastic material instead of depending on the particular yielding ability that is characteristic of a rubber-like member.

Broadly described, each of the two resiliently flexible plastic rings is of an angular radial cross-sectional configuration, the cross-sectional configuration having a first leg to embrace the inner hub flange of one of the sections of the case inside the hub opening of the reel, the cross-sectional configuration having a second leg to fit between the radial wall of said one section and the corresponding face of the reel. The two legs of the cross-sectional configuration are at an acute angle relative to each other when the ring member is in unrestrained state whereby interlocking the two sections of the case together with a ring member in each section, flattens the second legs of the two ring members with consequent distortion of each ring member into sealing contact with both the reel and the corresponding section of the case.

The features and advantages of the invention will be apparent from the following detailed description and the accompanying drawings.

In the drawings, which are to be regarded as merely illustrative:

FIG. 1 is an exploded perspective view of an assembly comprising a reel and the two complementary sections of a case, each of the two sections being equipped with an inner circumferential ring member embodying the present invention;

FIG. 2 is an enlarged perspective view of one of the two inner circumferential ring members;

FIG. 3 is a fragmentary exploded sectional view of the reel and the two sections of the case;

FIG. 4 is a fragmentary sectional view of the assembled case, the two inner circumferential ring members and the enclosed reel; and

FIG. 5 is a greatly enlarged radial sectional view of a ring member of the invention and an adjacent portion of the corresponding section of the case.

In the drawings, which illustrate the presently preferred embodiment of the invention, a circular case made in two sections 10 and 12 has the purpose of enclosing a reel, generally designated 14, in a snug dustproof and substantially airtight manner. In this instance, the structure of the reel 14 includes an inner cylindrical ring 15 which forms the hub opening of the reel and which interconnects two sidewall or radial webs 16 of the reel.

The section 10 of the case has an inner cylindrical hub flange 20, best shown in FIG. 3, with a radial wall 22 integral with the hub flange and with an outer cylindrical flange 24 (FIG. 1) integral with the radial wall. In like manner the section 12 of the case has an inner cylindrical hub flange 25 with a radial wall 26 integral with the hub flange and with an outer cylindrical flange 28 (FIG. 1) integral with the radial wall. In the construction shown, the outer cylindrical flange 28 is formed with spaced recesses 30 for access to the periphery of a reel when the reel is seated in the section 12 of the case. The radial wall 26 is slightly larger in diameter than the outer cylindrical flange 28 to overhang the flange and the overhanging portion of the radial wall is formed with an annular groove which seats in an elastomeric gasket 32. When the two sections 10 and 12 of the case are assembled together, the rim of the circumferential flange 24 of the section 10 compresses the gasket 32 to seal the outer peripheral region of the closed case.

In a well known manner, the two case sections 10 and 12 are adapted for interlocking engagement at the closed or sealed state of the case. For this purpose the case is provided with a latch mechanism of a well known construction comprising a latch means 34 permanently installed inside the flange 20 of the case section 10, and a

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second cooperative latch means 35 permanently installed inside the flange 25 of the second section 12 of the case. As shown in FIG. 3 the latch means 34 has an axial extension 36 that is equipped with an O-ring 38 and which incorporates manually operable rotary mechanism for axially compressing the O-ring to cause radial expansion of the O-ring. The second latch means 35 has a socket (not shown) to receive the axial extension 36. Thus to interlock the two sections 10 and 12 of the case when the two sections are assembled together is shown in section in FIG. 4. In FIG. 4, the axial extension 36 of the latch means 34 telescoped into the complementary socket of the latch means 35 and the rotary mechanism of the latch means 34 has been manipulated to expand the O-ring 38 to frictionally interlock the two sections.

The structure described to this point is conventional and not a part of the improvement provided by the present invention. The present invention comprises a pair of identical ring members, each of which is generally designated 40, one ring member frictionally embracing the inner cylindrical flange 20 of the casing section 10, the other ring member frictionally embracing the inner cylindrical flange 25 of the casing section 12 as shown in FIGS. 1 and 3.

As heretofore stated, the two ring members 40 may be made of any suitable resiliently flexible plastic material including nylon, polytetrafluoroethylene and polyester. These plastic materials in molded form are relatively smooth of surface and are resiliently flexible but unlike elastomeric material do not readily deform in response to compression across the thickness of the material.

As shown in FIG. 2, each of the ring or retaining members 40 has a first portion 42 in the form of a generally cylindrical flange dimensioned to embrace snugly an inner circumferential flange 20 or 25 of a section of the casing and each ring member has a second portion 44 in the form of an outwardly extending flange. As shown in FIG. 4, the outwardly extending flange 44 is intended to be sandwiched between the enclosed reel 14 and the radial wall of the corresponding section of the case. Thus a ring member 40 may be described as of angular radial cross-sectional configuration, the first portion 42 of the ring member forming one leg of the angular cross-sectional configuration and the second portion 44 forming the second leg of the cross-sectional configuration.

The first portion 42 of each ring member 44 is suitably slotted to form a circumferential series of fingers. Thus as best shown in FIG. 2, the first portion 42 of the ring member 40 is provided with a series of slots or notches 45 which form a circumferential series of flexible fingers 46. It is to be noted that the notches 45 are shorter in length than the axial dimension of the ring member so that the inner surface of the ring member is continuous in the region of the juncture of the two portions 42 and 44 as may be seen in FIG. 2.

At the unrestrained configuration of each ring member 40 shown in FIGS. 2 and 3, the second portion 44 of the ring member 40 is at an acute angle relative to the first portion 42. Thus at the unrestrained configuration of a ring member 40, the second portion 44 of the ring member is of conical configuration as shown in FIG. 3 and as indicated in dotted lines in FIG. 5.

Since the two installed ring members 40 serve both as sealing members and as spacer members under suitable sealing pressure provided by the cooperating latch means 34 and 35, it is desirable to form the second portion 44 of a ring member 40 with at least one circular rib on one of its faces. In this particular embodiment of the invention, two concentric ribs 48 are formed on the inner face of the second portion 44 of the ring member. Since the ribs 48 are rounded in cross section and are relatively narrow, they serve the same purpose as O-rings. When the two sections of the case are closed together to confine a reel 14, the ribs 48 make sealing contact with a corresponding radial wall 15 of the reel as indicated in FIG. 4.

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When the two sections 10 and 12 of the reel are assembled together to enclose a reel 14, the conical second portions 44 of the two ring members 40 are flattened as shown in FIG. 4. A primary advantage of the invention is that this flattening of a second portion 44 of a ring member 40 has two effects. The first effect is that forcibly distorting the second portion 44 from a conical configuration to a planar configuration results in radial contraction of the ring member in the region of the juncture of the two portions 42 and 44 of the sealing member. Thus with a ring member 40 dimensioned to embrace the inner cylindrical flange 20 or 25 of a section of the case, the flattening of the second portion 44 of the ring member causes the ring member to contract with consequent effective sealing pressure against the inner cylindrical flange.

The second consequence of the flattening of the second portion 44 of a ring member is to cause the flexible fingers 46 to be resiliently canted inwardly as shown in solid lines in FIG. 4 and as shown in dotted lines in FIG. 5. It is apparent then that each ring member 40 in its installed position provides a seal against each face of the reel and a seal against the corresponding inner cylindrical flange 20 or 25 of the corresponding section of the case in the region of the juncture of the two portions of the ring member. It is further apparent that the second portions 44 of the two ring members serve as spacers to confine and thereby retain the enclosed reel against axial movement and the resiliently biased fingers 46 to serve as spacer means to center the reel in the case and to resist radial movement of the reel relative to the surrounding case.

My description in specific detail of the selected embodiment of the invention will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims.

I claim:

1. A ring member for use in one of two releasably interlocking complementary sections of a case for enclosing a reel of tape or the like, wherein the reel has a central circular hub opening and two side faces and wherein each of the two complementary sections of the case has an inner cylindrical hub flange to telescope into the hub opening of the reel and further has a radial wall to extend over one face of the reel,

said ring member having a first portion of generally cylindrical configuration to embrace a hub flange of a section of the case inside the hub opening of the reel and having a second adjacent continuous outwardly extending portion to fit between a face of the reel and the radial wall of the corresponding section of the case,

the inner circumferential surface of the ring member being continuous in the region of the juncture of the two portions,

said first portion of the ring member being formed with a circumferential series of axially outwardly extending fingers,

said ring member being made of resiliently flexible plastic material and said second portion of the ring member at the unrestrained configuration of the ring member being at an acute angle to the first portion and extending from said juncture away from the radial wall of the corresponding section of the case whereby flattening of the second portion by closing the two sections of the case against the reel causes the second portion of the ring member to serve as a retainer to retain the reel against movement in the case and causes the ring member to contract radially in said region into tight contact with the hub flange of the corresponding section of the case and further causes said fingers to flex radially outwardly of the ring member to retain the inner circumferential surface of the hub opening of the reel against movement.

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2. A ring member as set forth in claim 1 in which said second portion of the ring member is conical.

3. A ring member as set forth in claim 1 in which said second portion of the ring member is formed with a least one concentric sealing rib on one of its two faces.

4. A ring member as set forth in claim 1 in which said second portion of the ring member is formed with two concentric ribs on its inner face for sealing contact with the reel.

5. In a case for enclosing a reel of tape or the like wherein the reel has a central circular hub opening with an inner circumferential surface and two side faces, the combination of:

two complementary case sections for enclosing the reel, each of said complementary case sections having an inner cylindrical hub flange for telescoping into the hub opening of the reel and a radial wall to extend over one face of the reel;

interlocking means for releasably interconnecting said complementary case sections;

a first ring member of resiliently flexible material;

said ring member having a generally cylindrical section embracing the hub flange of one of said complementary case sections with one end of said generally cylindrical section being closely adjacent the radial wall of said one complementary case section, said ring member also having an annular disk portion integral with said generally cylindrical section and extending radially outwardly therefrom adjacent said one end of said generally cylindrical section; and

said annular disk portion intersecting said generally cylindrical section to form an acute angle in radial cross-section with said annular disk portion extending away from the radial wall of said one complementary case section as it extends radially outwardly of said generally cylindrical section when said ring member is unrestrained whereby closing of the complemen-

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tary case sections forcibly urges one of the side faces of the reel against said annular disk portion to urge the latter into engagement with the radial wall of said one complementary case section to thereby flex at least a portion of said generally cylindrical section radially outwardly into engagement with the inner circumferential surface of the hub opening of the reel to cause both said generally cylindrical section and said annular disk portion to resiliently engage and retain the reel against movement within the complementary case sections.

6. A combination as defined in claim 5 wherein said generally cylindrical section has a substantially continuous region adjacent the juncture of said generally cylindrical section and said annular disk portion, the continuous region of said ring member, tightly engaging the hub flange of said one complementary case section, said generally cylindrical section also having a plurality of generally axially extending fingers joined to said continuous region, said fingers flexing radially inwardly upon the closing of said complementary case sections, and a second ring member on said hub flange of the other complementary case sections.

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