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J. R. PROCTOR

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CLAMPING RING

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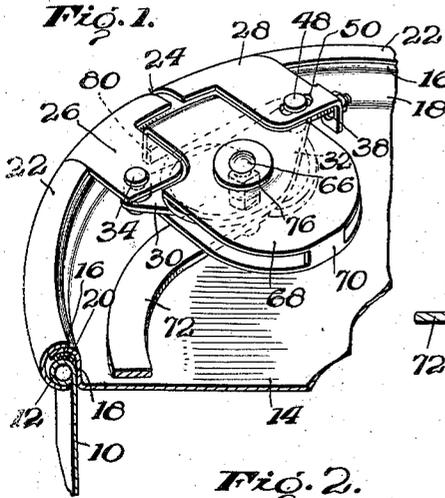


Fig. 4.

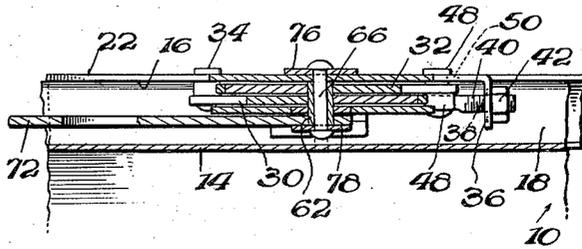


Fig. 2.

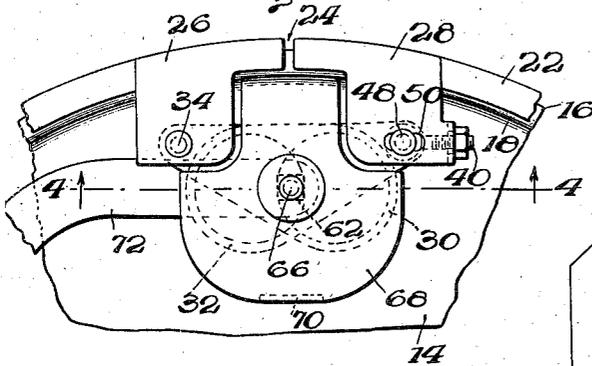


Fig. 5.

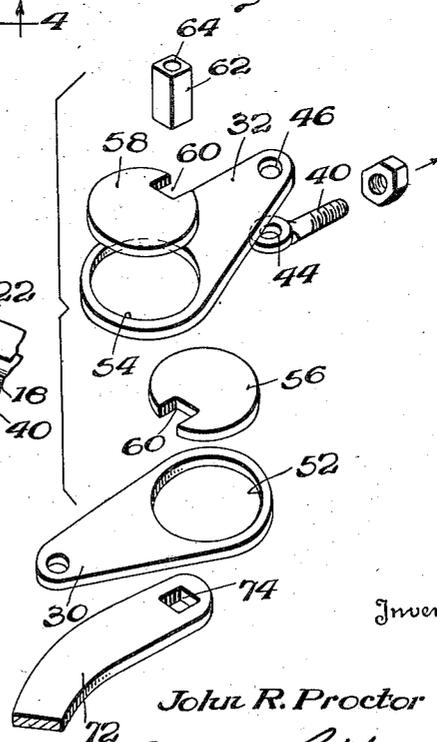
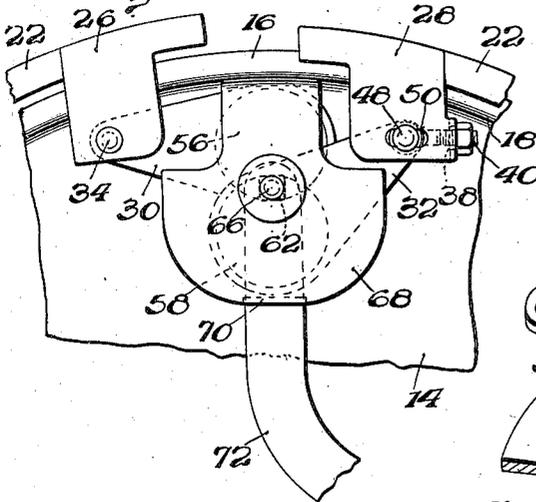


Fig. 3.



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# UNITED STATES PATENT OFFICE

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## CLAMPING RING

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12 Claims. (Cl. 220—61)

This invention relates to open-ended containers having a removable head and has particular reference to mechanism for retaining such head in position at the open end of the container to thereby form a fluid-tight seal.

More particularly, the invention relates to split clamping rings customarily used for this purpose and a novel combination produced by the cooperation of such clamping ring with the removable drum head.

Among the objects of the invention are to form a fluid-tight seal around the entire circumference of the joint between the barrel and its closure head; to provide mechanism easy to manipulate and rapid in action for drawing the ring tightly up around the assembled barrel and head; to so arrange the mechanism for accomplishing this that a self-locking function is obtained, thereby eliminating the need for a separate locking operation; to protect the mechanism during shipment of the barrels, and to so arrange the closing means that each 180-degree sector of the ring is wrapped simultaneously and progressively around the barrel from a point substantially diametrically opposed to the split end of the ring.

Various other objects and important features of the invention will appear from the specifications taken in conjunction with the drawing, wherein like numerals refer to like parts throughout the several figures, and wherein:

Figure 1 is a perspective of the ring end closure mechanism in ring closed and locked position;

Figure 2 is a plan view of the mechanism as illustrated in Figure 1;

Figure 3 is a plan view illustrating the ring end closing mechanism in partially closed position;

Figure 4 is a section along line 4—4 of Figure 2, and

Figure 5 is an exploded view illustrating the parts comprising the ring end closing mechanism and the manner of their assembly.

Referring now to the drawing, numeral 10 illustrates the side wall of a metallic open-ended drum having a rolled bead 12 extending around the periphery of the open end thereof. A more or less conventional drum head or cover 14 having a marginal flange 16 offset from the plane of the cover by a wall 18 is adapted to seat upon the peripheral bead 12, as illustrated. A gasket 20 is commonly interposed between the drum head flange and the bead to assist in forming a fluid-tight seal.

A channel-shaped clamping ring 22, split as indicated at 24, is adapted to embrace the bead

12 and the drum head flange 16 to compress the two firmly together when the split ends of the ring are drawn up snugly about the drum head assembly into the position illustrated in Figures 1 and 2.

Lugs 26 and 28 extend inwardly from the upper wall of the ring 22 adjacent the ends thereof. These may be formed integral with the ring itself or may be attached thereto as by spot-welding. In the form here illustrated the lugs extend radially inwardly and are slightly removed from the extreme ends of the ring.

Arms 30 and 32 are pivotally connected with the lugs 26 and 28 respectively. Arm 30 is pivoted directly to its associated lug by means of a pivot bolt 34. Lug 28 is provided with a depending flange 36 having an elongated slot 38 adapted to receive an anchor bolt 40. The slot 38 is elongated in a direction substantially normal to the circumference of the ring.

Anchor bolt 40 is threaded at one end to receive retaining nut 42 and is provided at the other with an aperture 44 adapted to align with aperture 46 in arm 32 for reception of a pivot bolt 48 which extends through an elongated slot 50 in lug 28. This slot is elongated in a direction substantially parallel to the ring where the lug 28 merges into it.

Arms 30 and 32 are each provided, adjacent the end opposite to that pivotally associated with the lugs, with circular bearings 52 and 54. Discs 56 and 58 are each provided with similar non-circular recesses 60 and the two discs are spot-welded together in eccentric overlapping relation so that the recesses 60 are in register with one another. The said cam discs are rotatably journaled respectively in the bearings 52 and 54.

Slidably received in the registered recesses 60 is a non-circular member 62 conforming in contour to that of the aligned recesses or, in other words, the non-circular aperture formed in the eccentrically associated discs. This member 62 is provided with a central circular passage 64 adapted to receive a retaining rivet 66.

The eccentrically arranged cam mechanism, together with its associated arms, is positioned within a housing element 68 having upper and lower walls connected by a web 70. Housing member 68 is contoured to cooperate with the shape of lugs 26 and 28 when the ring is in closed position to substantially cover the entire ring end closing mechanism, as illustrated in Figures 1 and 2.

An actuating lever 72 is provided at one end with an aperture 74 adapted to slip over the lower

end of member 62 below the bottom wall of housing 68. This constitutes a manually operable member by which the ring end closing mechanism may readily be actuated for closing and opening purposes.

The entire ring end closing assembly is held together by means of the rivet 66 cooperating with washers 76 and 78, an opening being provided in the lower wall of housing 68 sufficient in size to rotatably receive element 62 and one in the upper wall of sufficient size to receive the rivet 66.

The extreme end of housing 68 adjacent the ring 22 is adapted to cooperate with wall 18 of the drum head. In the form illustrated the ends of the upper and lower walls have been turned down and joined as illustrated to form a flange 80 adapted to abut against the said wall 18.

Operation of the mechanism to perform its intended function will be clear from the foregoing description. The ring is first placed about the drum head assembly, preferably in such manner that that portion of the ring diametrically opposed to the split end of the ring is firmly seated against the drum head to embrace the bead 12 and drum head flange 16. The actuating lever 72 during this operation is removed approximately 180° from that illustrated in Figures 1 and 2, permitting the ring ends to spread. Flange 80 of housing 68 moves up against the wall 18 of the drum head as lever 72 is swung across the face of the drum head to the position illustrated in Figures 1 and 2. The position of the various parts when the ring end has been partially closed by approximately a 90-degree movement of the actuating lever is illustrated in Figure 3.

The camming action of the eccentrically related cam discs 56 and 58 within the bearings formed for them in the ends of arms 30 and 32 will be apparent. Due to the relatively large bearing surface provided, the linkage may be manipulated with extreme ease, relatively little force being necessary to exert a substantial closing force on the ring ends. As will be apparent from the drawing, flange 80 of housing 68 constitutes an anchor pressing against the wall 18 of the drum head flange throughout closing movement of the ring ends, exerting a reaction force radially at a single point throughout the entire movement of the linkage. There is substantially no relative movement between flange 80 and flange wall 18 during closing of the ring ends, and wear is reduced to a minimum. The point at which the pressure is exerted is intermediate the split ends of the ring, and when the ring has reached its closed position, this pressure constitutes an effective sealing force to prevent possible leakage adjacent the split ends.

It is to be noted that when the ring ends have been brought to their closed position the cams are of course on dead center, but the pivot points at which the drums are connected to the lugs lie below center, thereby creating a double-acting self lock which cannot be overcome by any outside force except that applied through the manually operable actuating lever 72. As hitherto stated, the contours of the lugs cooperate with that of the housing member 68 to provide a substantially continuous protective cover for the entire linkage assembly when the ring ends are in closed position.

The elongation of slot 50 permits adjustment of the lock by nut 42 when contracting the ring

around the barrel, thus insuring against leakage.

Modifications of the structure herein illustrated and described will be apparent to those skilled in the art, and for that reason I wish to limit myself only within the scope of the accompanying claims.

What I claim is:

1. In combination with a split channeled clamping ring having inwardly extending lugs associated with each end thereof, an arm pivotally connected to each lug, a bearing in the free end of each arm, eccentrically related cams rotatably journaled in the bearings respectively, and means for rotating said cams as a unit to thereby draw the ring ends together.

2. In combination with a split channeled clamping ring having inwardly extending lugs associated with each end thereof, an arm pivotally connected to each lug, a bearing in the free end of each arm, integrally associated eccentrically related cams rotatably journaled in the bearings respectively, and means for rotating said cams as a unit to thereby draw the ring ends together.

3. In combination with a split channeled clamping ring having inwardly extending lugs associated with each end thereof, a bearing in the free end of each arm, a pair of discs eccentrically arranged in fixed overlapping relation to one another and rotatably journaled, respectively, in said bearings, and means for rotating said discs.

4. In combination with a split channeled clamping ring having inwardly extending lugs associated with each end thereof, a bearing in the free end of each arm, a pair of discs having similar non-circular recesses at one portion of their circumference and arranged in overlapping fixed relation with the recesses in register with one another, said discs being journaled in said bearings respectively, and means cooperative with said registered recesses for rotating the discs.

5. In combination with a split channeled clamping ring, arms having a circular opening at one end pivotally associated at their opposite ends with said ring adjacent the ends thereof, discs eccentrically arranged in fixed relation to one another positioned within said openings, and means for rotating said discs as a unit to draw the ring ends together.

6. A clamping device for removably securing a cover upon a barrel, said device comprising a split channeled ring, and means for contracting and expanding the ring, said means including a link pivotally connected with said ring adjacent each respective end thereof, bearings in the free ends of said links, eccentrically arranged discs fixed with relation to one another rotatably journaled in said bearings, and means for rotating said discs.

7. The combination with an open-ended container having a bead extending around the outer periphery of its open end and a removable cover having a marginal flange offset from the plane of the cover seated upon said bead, of a split channeled ring adapted to embrace said bead and flange to clamp them together, and means for contracting said ring about said bead and flange, said means including arms pivotally connected with the ends of the ring, bearings in the free ends of said arms, integral cams eccentrically related journaled in said bearings, means for rotating said cams to thereby contract the ring,

and a member operable during contraction of the ring to contact the wall of said flange intermediate the split ends of the ring and exert radial pressure outwardly thereon without relative movement between the contacting parts.

8. The combination with an open-ended container having a bead extending around the outer periphery of its open end and a removable cover having a marginal flange offset from the plane of the cover seated upon said bead, of a split channeled ring adapted to embrace said bead and flange to clamp them together, and means for contracting said ring about said bead and flange, said means including arms pivotally connected with the ends of the ring, bearings in the free ends of said arms, integral cams eccentrically related journaled in said bearings, means for rotating said cams to thereby contract the ring, and a housing for said cams and arms, said housing including a portion operable during contraction of the ring to contact the wall of said flange intermediate the split ends of the ring and exert radial pressure outwardly thereon without relative movement between the contacting parts and to maintain pressure thereagainst after the ring is fully contracted.

9. In combination with a split channeled clamping ring, arms in pivotal connection with each end of the ring, a bearing in the free end of each arm, eccentrically related cams rotatably journaled in the bearings respectively, and means for rotating said cams as a unit to thereby draw the ring ends together, said cams being so related to one another and to the pivoted ends of the arms that the expanding force of the closed ring tends to lock the cams in ring-closed position.

10. A clamping device for removably securing a cover upon a barrel comprising a split channeled ring, means for contracting and expanding the ring, said means including a link pivotally associated with each end of the ring respectively, rotatable means connected with the free ends of said links for drawing the ends of the

ring together, said means being so constructed and arranged with reference to said links that expanding force of the closed ring ends operates through the links to retain said ends together, and a member associated with said rotatable means operable during contraction of the ring to contact the cover intermediate the split ends of the ring and exert radial pressure outwardly thereon without relative movement between the contacting parts.

11. A clamping device for removably securing a cover upon a barrel, said device comprising a split channeled ring, inwardly extending lugs adjacent the ends of the ring, means for contracting and expanding the ring, said means including a link pivotally connected to each lug, and a rotatable actuating member pivotally associated with the free ends of the respective links at opposite sides of its rotative center, and a member associated with said actuating member operable during contraction of the ring to contact said cover and exert radial pressure outwardly thereon without relative movement between the contacting parts.

12. The combination with an open-ended container having a bead extending around the outer periphery of its open end and a removable cover having a marginal flange offset from the plane of the cover seated upon said bead, of a split channeled ring adapted to embrace said bead and flange to clamp them together, means for contracting said ring about said bead and flange, said means having pivotal connection with the ends of said ring and being so arranged and constructed with reference thereto that expanding force of the closed ring ends operates to hold said ends together, and means associated with said ring contracting means operable during contraction thereof to exert radial pressure outwardly upon a fixed portion of the wall of said flange.

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