Dec. 27, 1960 H. L. CARPENTER ET AL 2,966,378

CLOSURE ASSEMBLY FOR FIBRE CONTAINERS

Filed Oct. 17, 1957

2 Sheets-Sheet 1

FIG. 1

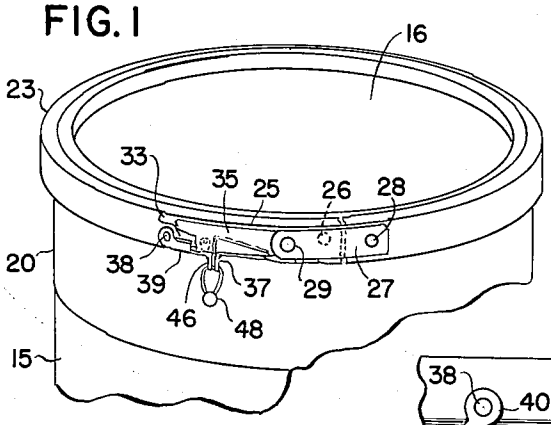


FIG. 2

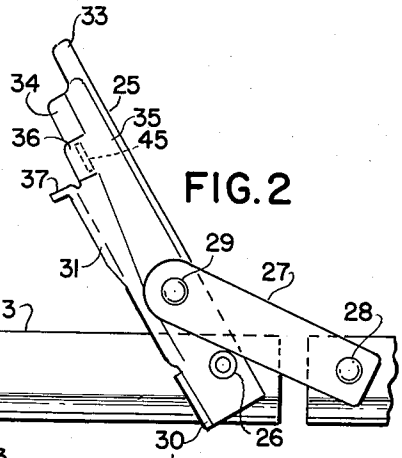


FIG. 3

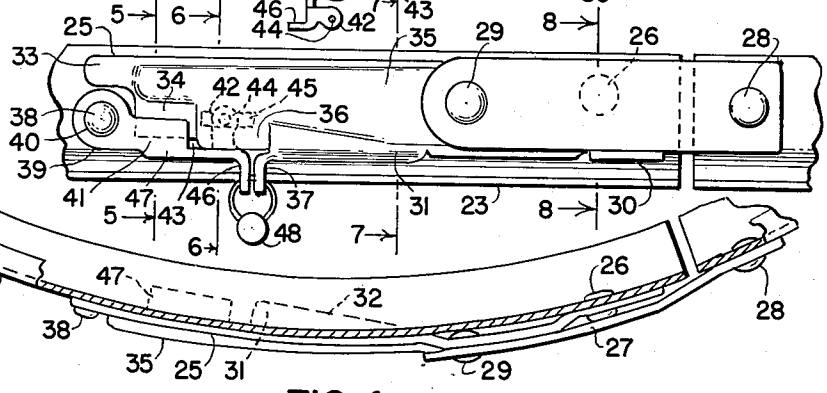


FIG. 4

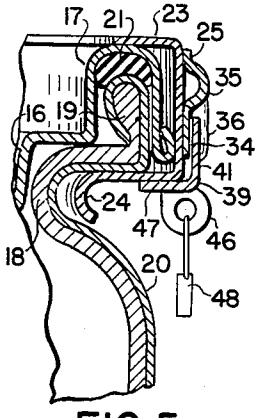


FIG. 5

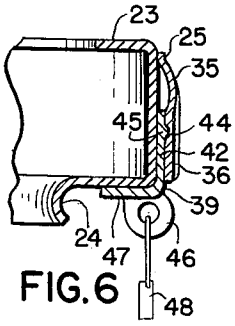


FIG. 6

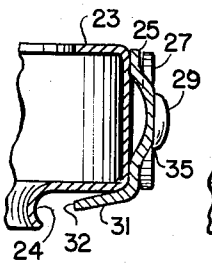


FIG. 7

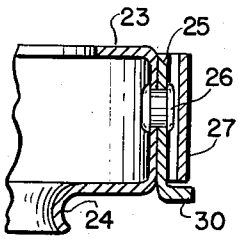


FIG. 8

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2 Sheets-Sheet 2

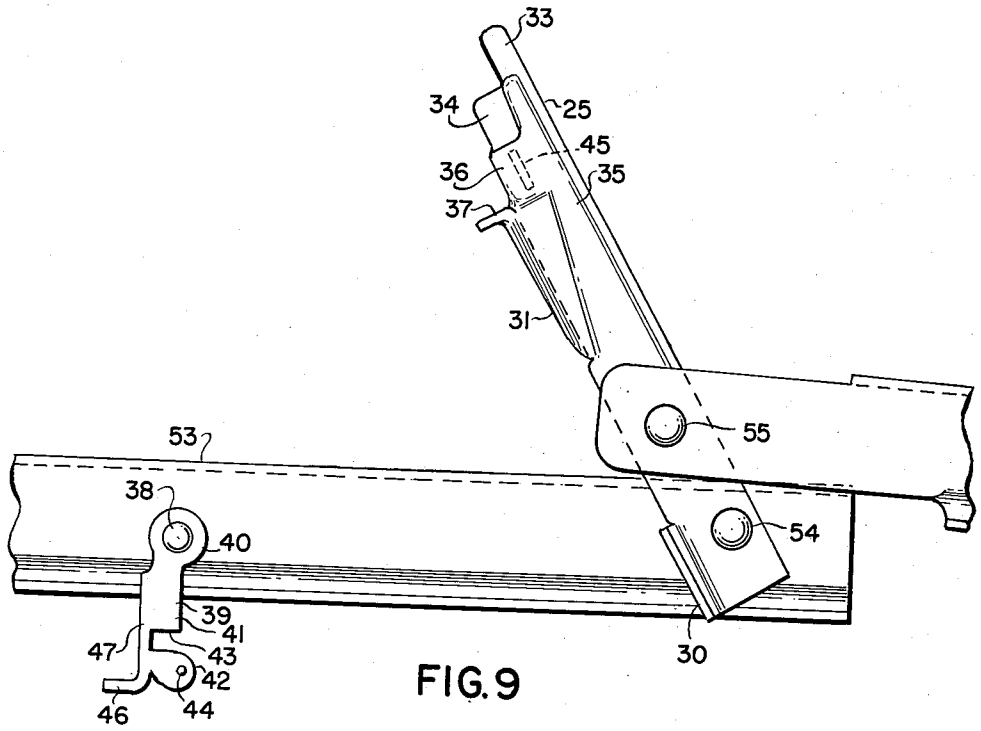


FIG.9

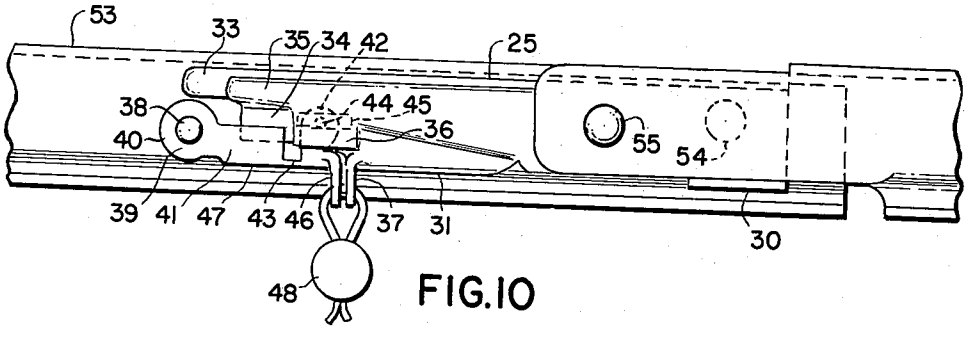


FIG.10

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CLOSURE ASSEMBLY FOR FIBRE CONTAINERS

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9 Claims. (Cl. 292—256.69)

This invention relates to a structurally and functionally improved closure assembly for containers and especially containers made of fibre or steel. Our invention has particular relation to an improved locking rim for containers of this type.

This application is a continuation-in-part of our prior application for United States Letters Patent, filed on November 2, 1953, identified under Serial No. 389,731, and entitled "Closure Assembly For Fibre Containers and Method of Making the Same," now Patent No. 2,884,176 granted April 28, 1959.

This invention relates to an improved closure assembly for containers, particularly fibre and steel containers, in which the closure may be readily applied and removed but will be firmly held against accidental opening or displacement when in use.

A further object is the provision of a closure assembly of the above type which may be readily sealed in such a fashion that any tampering therewith or any attempt to remove or pollute the contents of the container will be immediately apparent.

Another object of the invention is the provision of an improved locking rim for containers in which the rim is expanded and contracted by means of an improved locking lever arrangement which is of simple, rugged construction; which may be readily manipulated when it is desired to open and close the container; which is firmly and securely held in locked position; and which is so arranged and designed that blows directed against the locking lever will be deflected therefrom and will not damage or inadvertently cause the opening thereof.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating practical embodiments of the invention, and in which:

Fig. 1 is a perspective view of the upper end of a container and showing one form of locking rim applied thereto with a locking lever in a locked position;

Fig. 2 is an elevational view of the end portions of the locking rim assembly with the locking lever in partially open position;

Fig. 3 is a view similar to Fig. 2, but showing the components of the locking rim assembly in a locked position;

Fig. 4 is a plan view of the assembly illustrated in Fig. 3;

Figs. 5, 6, 7 and 8 are transverse sectional views taken respectively along the lines 5—5, 6—6, 7—7 and 8—8 in the direction of the arrows as indicated in Fig. 3;

Fig. 9 is an elevational view of the end portions of a modified form of locking rim assembly showing the locking lever in partially open position; and

Fig. 10 is a view similar to Fig. 9, but showing the locking rim assembly in a locked position.

Referring primarily to Figs. 1 and 5, the numeral 15 indicates the body or drum of a container which may be formed of any desired material such as steel or other metal, reinforced plastics, or may be fabricated from convolutely wound, laminated layers of kraft board, fibre or the like. The upper end of the drum may be closed

by closure 16 which may be formed of metal or the like. The edge of closure 16 is defined by an upwardly-extending inverted channel 17 having an arcuate upper surface. The upper end of body 15 is formed with an external circular groove and an internal circular bead 18 and with a chime portion 19 extending thereabove. A band 20 preferably of metal is applied to the outer face of drum 15 adjacent its upper end and conforms to the surface configuration of the body at this end substantially as shown in Fig. 5. There it will be seen that the upper edge of band 20 may extend over and downwardly with respect to the surfaces of chime 19. Additionally, a layer of packing material in the form of a sealing gasket 21 may be conveniently provided in channel 17 of the closure so as to bear against chime 19 to provide a seal when the closure 16 is applied to the drum 15.

Encircling the upper end of drum 15 is a locking rim 23. Locking rim 23 is substantially U-shaped in cross-section, with the distance between the inner faces of its flanges equal to the distance between the upper surfaces of channel 17 and upper surface of that portion of band 20 disposed in groove 18 when the closure 16 is properly applied to the body of the receptacle. (See Fig. 5.) The lower flange of the locking rim 23 terminates in a substantially laterally-extending guiding portion 24 having a configuration enabling it to extend into the groove 18. The lower flange of locking rim 23 serves as a locking flange engaging surfaces of band 20 disposed in groove 18 and it projects inwardly a greater distance than the upper flange of rim 23 which serves as a camming flange. More specifically, by constricting the rim 23 around the upper end of drum 15, the lower locking flange face engages surfaces in groove 18 and thereafter the upper camming flange engages the rounded upper surface of channel 17, thus forcing the closure 16 downwardly until it is properly seated on drum 15.

As clearly illustrated in Figs. 2 to 4, locking rim 23 is provided with two flexible ends which are adapted to be adjacent each other when the rim 23 is properly constricted around closure 16 and drum 15 of a container. As more fully illustrated in Figs. 2, 3 and 4, a locking rim assembly is provided to constrict locking rim 23 or expand it to a releasing position to facilitate seating and removal of closure 16 respectively.

To provide the mechanism for attaining these results, a locking lever 25 is pivotally mounted on locking rim 23 adjacent one end thereof as by pivotal connection 26. A link 27 has one end thereof mounted adjacent the second end of the locking rim 23 by means of a pivotal connection 28. The other end of link 27 is pivotally connected at 29 to locking lever 25 intermediate the ends of the latter. Thus, as the rim is constricted, the pivotal connections will move past dead center positions with respect to each other so that an expensive force acting on the locking rim 23 will result in closing rather than opening the rim. Also, the character of the metal providing the rim 23 and the several pivotal connections will be such that sufficient resiliency is incorporated in the locking rim assembly to allow the components thereof to assume proper positions as an operator asserts suitable pressures thereon. With the relief of these pressures and with the components in constricted condition, the assembly is firmly and securely retained in a locked position.

When the locking lever 25 is shifted downwardly to the locked position, pivotal connection 26 is conveniently disposed above pivotal connections 28 and 29 and past dead center with respect thereto so as to resist accidental opening of the locking rim 23. (See Fig. 3.)

It will be observed that at a point adjacent pivotal connection 26, the lower edge of lever 25 extends outwardly in the form of a flange 30. Flange 30 provides a stop in cooperation with the lower edge of link 27 and

as especially shown in Figs. 3 and 8, prevents the locking lever 25 from being swung downwardly around its pivotal connection 26 beyond a desired position. If an attempt is made to swing lever 25 downwardly beyond this point, further movement of the parts will be arrested by the restraining action provided by the contact of link 27 with flange 30.

Beyond the pivot 29 lever 25 provides in its lower edge an inturned flange 31. As illustrated in Fig. 4, the inner edge 32 of this inturned flange 31 is tapered to extend at an angle with respect to the adjacent locking rim body. When the locking lever 25 is swung downwardly from the position in Fig. 2 to that illustrated in Fig. 3, the flange 31 will cam against the face of the locking rim 23 and therefore override the upper edge of rim 23 to swing or flex the upper end of locking lever 25 outwardly and upwardly. Accordingly, it will be apparent that the tapered inner edge 32 of inturned flange 31 will function as a cam. As the locking lever 25 approaches a position such as illustrated in Figs. 3 and 4, this inturned flange 31 will override and engage the lower edge of rim 23, as more clearly illustrated in Fig. 7. In this manner, a locking structure is furnished thereby preventing an accidental raising of lever 25 to cause it to swing in a clockwise direction. A deliberate movement of locking lever 25 may be attained by asserting pressure in a radially outward and upward direction against the free end of lever 25 in order that flange 31 will move beyond the outer face of locking rim 23.

The outer end of lever 25 preferably features a reduced extension 33 projecting beyond a substantially flat downwardly-etxending portion 34 of substantially rectangular configuration. The main body portion of the locking lever is preferably bulged outwardly as at 35 to enhance the rigidity of lever 25 and to furnish a deflecting surface as will hereinafter be emphasized. Extending from bulged portion 35 and disposed immediately adjacent flat portion 34 is a downwardly-extending outwardly bulged portion 36.

A downwardly projecting sealing lug 37 having an aperture extending therethrough is conveniently provided as an extension of flange 31.

Adjacent that point on locking rim 23 embracing the zone of rest of the locking lever extension 33, a pivotal connection 38 is preferably provided. This pivotal connection provides a support for one end of a rotatable retaining lever 39. Retaining lever 39 conveniently includes a coaxial substantially circular disk portion 40 adjacent to and associated with pivotal connection 38. This disk portion 40 is so formed as to engage extension 33 of locking lever 25, thereby insuring that flange 31 engages the undersurface of locking rim 23 when retaining lever 39 is pivoted in a counterclockwise direction to a closed position.

Additionally, retaining lever 39 is provided with a somewhat bulged retaining flange or pocket 41. At the free end of retaining lever 39 a substantially flat extension 42 is defined, which extension is separated from retaining flange 41 by an elongated slot 43. Extension 42 preferably has an effective width slightly less than bulged portion 36 of locking lever 25. Further, extension 42 mounts a protuberance 44 on the outer face thereof cooperable with a dimple, depression or recess 45 in bulged portion 36 of locking lever 25. Extending below the extension 42 of retaining lever 39 is a locking lug 46 having an aperture extending therethrough. Finally, it will be observed that the lower edge of retaining lever 39 preferably includes an inwardly-extending flange 47.

When the locking lever 25 is in locked position with retaining lever 39 in its closed position, as illustrated in Figs. 3 and 6, a sealing element 48 may have its wire or cord pass through the apertures in lugs 37 and 46. It will thus be apparent that the drum cannot be opened without breaking this sealing element which will clearly indicate that someone has tampered with or otherwise opened the locking rim and closure assembly.

It will be assumed that the locking rim assembly is in the position shown in Fig. 2 and it is desired to constrict the locking rim 23 into locking engagement with the drum 15 and closure 16. With the locking element 23 applied to the proper zone of the receptacle, lever 25 may be swung in a counterclockwise direction around its pivot 26. In so swinging, it will, through link 27, serve to draw the adjacent ends of the locking rim 23 towards each other. As flange 31 reaches a position to contact with the upper edge of locking rim 23, tapered surface 32 will cam against that edge and flex the free end of the locking lever 25 outwardly in the manner heretofore described. This flexing will be maintained until flange 31 rides beyond the lower surface of locking rim 23. When this occurs, lever 25 will move inwardly to a point where it will be in substantially face-to-face contact with the outer surface of the locking rim 23. At this point, flange 31 engages against the lower edge of rim 23 and flange 30 engages the lower edge of link 27. An upward movement of the lever 25 cannot occur because of the locking action furnished by flange 31. Further movement of lever 25 in a counterclockwise direction cannot occur because of flange 30 engaging the lower edge of link 27. The locking rim 23 will accordingly be in a constricted position, thus causing the closure 16 to be forced downwardly into proper seating position with respect to the upper edge of drum 15.

Simultaneously, with lever 25 assuming a proper position as in Fig. 3, its extension 33 will assume a position above pivotal connection 38. Extension 33 will be in suitable engagement with disk portion 40 of retaining lever 39, which serves as an additional stop means for further counterclockwise movement of locking lever 25. The retaining lever 39 is swung in counter-clockwise direction around its pivotal connection 38 and bulged portion 36 of locking lever 25 will receive extension 42 of retaining lever 39. Additionally, flat portion 34 of locking lever 25 will be received by pocket 41 of retaining lever 39. The juncture between flat portion 34 and bulged portion 36 of locking lever 25 will conveniently pass through slot 43 of retaining lever 39. The disk portion 40 of retaining lever 39 will urge flange 31 against the lower surface of rim 23. Counterclockwise movement of retaining lever 39 is limited by the upper face of flange 47 engaging the under face of rim 23. During the counterclockwise movement of retaining lever 39 protuberance 44 will override the under surface of bulged portion 36 of locking lever 25 and ultimately fall into recess 45 therein to lock the levers with respect to each other. Under these circumstances, with the parts in the position shown in Fig. 3, the apertures of lugs 37 and 46 are aligned. Sealing means 48 may then be properly positioned in these apertures in order that opening or expanding of the locking rim 23 may be detected.

As will be apparent when the locking lever 25 is in its rim-constricting position, bulged portion 35 presents an outwardly curved surface serving as a deflector of any downward blows accidentally exerted on the locking rim assembly which might swing the retaining lever 39 to a releasing position. This retaining lever 39 holds the locking lever 25 against the locking rim 23 so as to prevent it from shifting outwardly and thereby assuring engagement between flange 31 and the lower surface of locking rim 23. The entire structure is additionally retained against accidental displacement by frictional contact of its surfaces and/or the locking means provided by the protuberance and recess means 44 and 45.

In Figs. 9 and 10 we have shown a modified form of locking rim assembly in which the locking lever 25, identical in construction with the locking lever shown in Figs. 1 to 8 inclusive, is pivotally connected directly to the two adjacent ends of the locking rim 53. Thus, it will be seen that the locking rim 53 is similar in construction to lock-

ing rim 23 with the exceptjion that the two ends are arranged in overlapping relationship and the locking lever 25 is pivotally connected at 54 adjacent its one end to the overlying end portion of the locking rim 53 and is pivotally connected at an intermediate portion 55 to the opposite overlying end portion of the rim 53. Accordingly, it will be apparent from Fig. 9 that when the locking lever 25 is pivoted in a clockwise direction to an elevated position, the pivotal connection 55 is shifted to the right to expand the rim 53. When the locking lever 25 is pivoted in a counterclockwise direction to the horizontal position shown in Fig. 10, the rim 53 will be in a constricted position. In this position the pivotal connections 54 and 55 have shifted past dead center so that the pivotal connection 54 is positioned above the pivotal connection 55 whereby any expansive force exerted on the rim 53 tends to shift the locking lever 25 to its locked position.

The structure of the locking rim assembly may in all other respects be similar in construction to the assembly shown in Figs. 1 to 8 inclusive. Thus, in the course of constricting the locking rim 53, the upper flange thereof, as previously explained, exerts a camming action upon closure 16 to cause it to properly close and seat on the top of drum 15. Locking lever 25 may be provided with a radially-extending flange 30 along its lower edge at the inner end thereof which engages the lower edge of the overlapping rim portion to serve as a positive stop to limit the counterclockwise pivoting of the locking lever 25. The retaining lever 39 rotatable on pivotal connection 38 serves as a positive stop by engaging with the projecting extension 33 of locking lever 25 to limit a downward movement thereof below the desired horizontal position. The locking lever 25 is also provided with camming flange 31 intermediate the ends thereof for engagement with the lower edge of locking rim 53 when the lever 25 is in a horizontal locked position so as to prevent accidental release thereof. As previously explained, the flange 31 has a tapered edge 32 which serves a camming function when it engages locking rim 53, thereby shifting locking lever 25 outwardly as it is moved from an elevated position to the horizontal locked position.

The retaining lever 39 is also similar in construction to the lever shown in Figs. 1 to 8 inclusive, and is provided with an outwardly formed pocket 41 which receives the substantially flat portion 34 of locking lever 25 when the parts are in the locked position shown in Fig. 10. Further, retaining lever 39 will have an extension 42 which is received by bulged portion 36 of locking lever 25. A slot 43 in retaining lever 39 again conveniently facilitates surfaces of the levers to be properly positioned. Similarly, the retaining lever 39 features an inwardly-projecting flange 47 along its lower edge to engage the under surface of the locking rim 53 when in a closed position. It is also provided with an outwardly-projecting protuberance 44 on extension 42 to provide a locking means with recess 45 in the under surface of bulged portion 36 of locking lever 25. The locking lever 25 and retaining lever 39 are also formed with depending lugs 37 and 46 respectively with apertures extending therethrough so that a sealing means 48 may be applied therethrough so as to readily reveal any tampering with the container or the contents thereof. The locking lever 25 is also preferably provided with an outwardly bulged portion 35 that reinforces the lever and acts to deflect any downward blows that may strike the lever 25 to thereby prevent accidental release of the retaining lever 39. The operation of the assembly shown in Figs. 9 and 10 is in most respects similar to the operation of the form of our invention shown in Figs. 1 to 8 inclusive.

Under Fig. 1, the body of the container or drum 15 may be constructed of laminated fibre or metal or of reinforced plastic material, or a combination of any of them, without departing from this invention.

While we have illustrated and described the preferred

embodiments of our invetnion, it should be understood that modifications may be made therein without departing from the invention as set forth in the accompanying claims.

We claim:

1. A locking rim for a container comprising in combination: a split rim lying in a plane and being cooperable to extend circumferentially around a container, and said split rim being provided with two end portions positioned substantially adjacent each other; a locking lever having pivotal connection adjacent one of its ends with one of the end portions of the split rim; means for pivotally connecting the other end portion of the split rim with an intermediate portion of the locking lever; all of said pivotal connections being disposed at right angles to the split rim so that said locking lever is shiftable in a plane normal to the plane in which the split rim lies from a locked position in close proximity to said split rim to an unlocked position extending at an angle therefrom; said locking lever being provided with a laterally projecting flange for engaging an edge of said split rim when the locking lever is in a locked position so as to limit the movement thereof, said flange being tapered to provide a camming surface so that said locking lever is cammed outwardly with respect to the split rim when said locking lever is shifted from open to locked positions and a slotted retaining lever pivotally mounted on said split rim adjacent the other end of said locking lever when said locking lever is in a locked position, said retaining lever being mounted for rotation in a plane normal to the plane in which the split rim lies from a position in alignment with said split rim to a position extending at an angle therefrom; said locking lever being provided with an outwardly bulged portion and a substantially flat portion extending from said outwardly bulged portion, and said bulged portion and said flat portion being cooperable to engage surfaces of said slotted retaining lever to couple said locking lever with said retaining lever.

2. The invention as defined in claim 1, wherein said locking lever is provided with a pair of flanges projecting outwardly from one edge thereof in opposite directions so as to engage the corresponding edges of the end portions of the split rim and of said means respectively when the lever is in a locked position so as to confine and limit the movement thereof.

3. The invention as defined in claim 1, wherein said retaining lever is provided with a substantially flat portion at the free end thereof and an outwardly bulged portion disposed intermediate said free end and said pivotal connection of said retaining lever, and a slot provided in said retaining lever extending intermediate said substantially flat portion and said bulged portion of said retaining lever, said substantially flat portion and said bulged portion of said retaining lever being so constructed and arranged to engage said outwardly bulged portion and said substantially flat portion of said locking lever respectively.

4. The invention as defined in claim 1, wherein said pivotal connection of said locking lever with said one end portion of said split rim is arranged in offset relationship with respect to said pivotal connection of said means with said other end portion of the split rim and with said intermediate portion when said locking lever is in said locked position.

5. The invention as defined in claim 1, wherein said retaining and locking levers are provided with an engageable protuberance and recess so as to releasably retain them in locked position.

6. The invention as defined in claim 1, wherein said locking lever is provided with an outwardly extending flange adjacent said pivotal connection of said locking lever with said one end portion of said split rim, said outwardly extending flange adapted to bear against said means when said locking lever is in a locked position so that movement of said locking lever is limited.

7. The invention as defined in claim 1, wherein said

locking lever is provided with a convex longitudinally extending channel portion to reinforce and strengthen the locking lever and to provide a deflecting surface.

8. The invention as defined in claim 1, wherein said retaining lever is provided with a disk portion adjacent its pivotal connection with said split rim, and said locking lever is provided with an extension adjacent the substantially flat portion of said locking lever cooperable to engage the disk portion of said retaining lever, said risk portion of said retaining member adapted to maintain portions of said locking lever in firm engagement with said split rim when said locking lever is in said closed position and adapted to limit movement of said locking lever.

9. The invention as defined in claim 1, wherein said retaining lever is provided with an inwardly extending flange cooperable with said split rim to limit movement of said retaining lever.

References Cited in the file of this patent

UNITED STATES PATENTS

2,071,535	Jesser	Feb. 23, 1937
2,111,372	Rollason	Mar. 15, 1938
2,304,911	Harpold	Dec. 15, 1942
2,382,858	Carpenter	Aug. 14, 1945
2,579,975	Scott et al.	Dec. 25, 1951
2,864,638	Nelson et al.	Dec. 16, 1958