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NONREFILLABLE CLOSURE

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17 Claims. (Cl. 215—42)

This invention relates to connecting devices and has particular reference to nonrefillable closures.

One object of the invention is to provide a device of the character described whereby the different members may be separate of each other so as to be separately interengaged.

Another object of the invention is to provide a device adapted to be locked and to be released in an improved manner, as by a simple impact.

A further object of the invention is the provision of a device having relatively few and simple parts, and which can be easily assembled, and which is neat, compact, durable, reliable and convenient in use.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a fragmentary sectional view taken on the line 1—1 of Fig. 2 and showing a device embodying the invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a top plan view of the closure member.

Figs. 4 and 5 are fragmentary views in elevation of the device with the sealing member removed, and the projections thereof shown in dot dash lines, Fig. 4 showing the initial and Fig. 5 the locked position of the device and sealing member projections.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 5.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Generally described the invention provides a plurality of members movable relatively to each other in any suitable path, for instance, cir-

cularly. Extending between the members is a coupling means having movable engagement at different times, or along different paths, extents or directions, with the different members. In this manner, the coupling means may be utilized for creating a force therebetween and the members for producing different effects. For example, if the members be interengaged as by a cam, thread or equivalent arrangement, the means referred to may be moved first to actuate one of the members to affect the cam or thread interengagement, as to tighten the same and subsequently the means may be moved to cause release of the coupling from one or both of the members, as for removal of the coupling. The movable engagements mentioned may be accomplished by elements adapted for lost motion connection. The advantages of the invention are best exemplified in a device wherein the coupling or like means is attachable to the members only when the latter are in a predetermined position relative to each other; for example, upon alinement of certain of the elements. In that case the elements on said means are movable into a position such that on moving the means to move one of the members, a disalinement is produced to prevent disengagement of the elements. While the invention is broadly applicable for interconnection between devices such as tubes, yet if the means be in the nature of an enclosure for the member that is moved to the end of the path of lost motion therewith, the enclosed member will be inaccessible for movement and will not respond to movement of the said means along its other path or direction, and hence the elements cannot be realigned. Thus the removal of the said means cannot be effected, except as by breakage of the means or of one of the members. Such breakage of an appropriate part can be accomplished by actuating the means along the other path mentioned, and without disturbing the interengagement between the members themselves. The action may be described as involving lost motion engagement operative in opposite directions. If the interengagement between the members is not affected or only in a negligible degree by movement therebetween, then the lost motion engagements may be operative in the same direction, the path for one extending beyond the path for the other. A possible construction may include bayonet slots on the members and spaced projections on the means for engaging in the slots. But these parts may be reversed in position, between the means and members and between the means and only one of the members.

The spacing as between the bayonet slots may be insufficient for the passage of a projection, which can thus pass only through aligned parts of the slots, or else is locked if such parts are out of alignment. Since one of the bayonet slots may be wholly open at a top thereof, it is not necessary that the projections be aligned with each other. While the projections may be fixed or integral in construction, they may also be removable and applied as desired. Then again, the frangible part, if one be used, may be broken by wedging engagement with one or the other of the members, and may also be broken by a different mode of operation involving broadly the application of an axial impact on the means or sealing member for wedgingly engaging a shoulder on one of the members, such sealing member having clearance and free or lost motion relation with the member therein, so that the latter and the connection between the same and the remaining member or container may not be disturbed or broken. Finally, it may be mentioned that the enclosed member may be regarded broadly as actuatable by any relatively inaccessible means, whether a part of the sealing member or not, to produce the disalignment mentioned.

Referring in detail to the drawing, 10 denotes a device embodying the invention. The same may include a container or tubular member 11, which may have an end portion or neck 12, at the base of which may be provided an annular wedge like shoulder 13. The said neck may be externally provided with connecting means, such as the cam or thread type 14. Below the thread is provided an annular lip 15 having a plurality of angularly spaced cut outs 16, each communicating with a recess, opening or channel 17 between the shoulder 13 and the lip 15. The respective openings 17 are angularly separated from each other by cam elements 18 all arranged in a corresponding manner.

A tubular or closure member 19 may coact in any suitable manner with the member 11, preferably by being connected thereto in a way that will permit relative rotation between the members. Thus the closure member may be engaged with the thread 14. A yielding gasket disc 20 may be provided in the closure member to engage the neck 12.

The closure member 19 may have angularly spaced external openings or recesses 21, which are desirably of extended size horizontally and vertically, open at the top, and partially closed at the bottoms as by lips 22, providing cut outs 23 adapted to align and communicate with the cut outs 16.

A third tubular, coupling, or sealing member 24 may surround or wholly enclose the closure member 19, preferably in coaxial relation therewith. The member 24 may have a top wall 25 spaced over the closure member, and may have a plurality of series of internal projections or lugs, each series including an upper lug 26 and a lower lug 27, arranged in a suitable manner so that the upper lug is receivable in an opening 21 and the lower lug adapted to enter an opening 17 through the cut outs 16, 23, in the aligned position thereof. The upper lug is adapted to engage an abutment or edge of the opening 21 as at 28. The lower lug is of such size as to be unable to enter the space between the lips 15 and 22 and is arranged so as to be adapted to engage the wedges 13 and 18.

In operation, the container 11 is filled with its desired contents and the closure 19 screwed

thereon reasonably tight, to a predetermined position, such that cut outs 16, 23 are in alignment. Then the sealing member 24 is applied as shown, with lugs 26, 27 positioned as in Fig. 4. Now the sealing member is turned to cause lug 26 to press on the abutment 28 to cause angular movement of the closure 19 from the initial position, with the cut outs 16, 23 out of alignment, as shown in Fig. 5. Hence the sealing member is locked in place by the lug 27, since passage thereof through the cut out 23 is blocked by the lips 15 and 22. To open the container, the sealing member may have a frangible part, such as that at the region of the lugs 27. For example, the sealing member may be made of a frangible material. Hence the sealing member may be turned in reverse direction, there being sufficient clearance in the openings 17 and 21 for the lugs 26, 27, and the lugs 27 caused to engage wedges 18 to fracture the frangible portion, so that the sealing member may be completely removed.

Another manner of removal of the sealing member is also possible. An impact may be struck the sealing member top wall 25, to cause the lower lugs 27 to engage the annular wedge 13 to cause a similar fracture of the sealing member for removal thereof. In either case, the breaking and removal of the sealing member does not affect the closure member, there being adequate clearance for relative movements therebetween.

It will be appreciated that various changes and modifications may be made in the device as shown in the drawing, and that the same is submitted in an illustrative and not in a limiting sense, the scope of the invention being defined in the following claims.

I claim:

1. A device including a container member, a closure member threadedly connected thereto, a sealing member enclosing the closure member, the container and sealing members having means including oppositely extending bayonet slots having portions adapted to align with each other, the bayonet slot of the closure member being open at the top thereof, the sealing member having a plurality of vertically spaced approximately aligned lug means, the upper lug means being receivable in the bayonet slot of the closure member through the top opening thereof, the lower lug means being receivable in the bayonet slot of the container member through the aligned portions of said slots, the sealing member being rotatable to cause the upper lug means to abut an edge of the bayonet slot thereof to rotate the closure member into increasingly tight threaded engagement with the container member and with the aligned portions of the bayonet slots moving out of alignment to lock the lower lug means against removal of the sealing member, said sealing member being movable relative to the container member, and the latter and sealing member being adapted for wedge engagement to cause breakage of the sealing member upon movement of the sealing member in a direction other than to cause tightening of the closure member.

2. A device including a plurality of members having lips in proximity to each other, said lips having cut outs adapted to align with each other, said members having openings of larger size than the cut outs and communicating with their respective cut outs, the said openings of the different members being separated from each other

by said lips, said members being movable relatively to each other so as to move said cut outs out of alinement with each other, one of the members having an abutment adjacent to the opening thereof, a means for enclosing the member having the abutment, said means having a plurality of spaced projections, one of said projections being movably receivable by the opening of the member having the abutment, the other projection being movable through the aligned cut outs to be movably received by the opening of the other member, and said means being movable so that the first mentioned projection actuates said abutment to cause the relative movement between the members, and the second mentioned projection being locked by said lips, in the position of the cut outs out of alinement with each other upon occurrence of the relative movement between the members.

3. A device including a plurality of members having lips in proximity to each other, said lips having cut outs adapted to align with each other, said members having openings of larger size than the cut outs and communicating with their respective cut outs, the said openings of the different members being separated from each other by said lips, said members being movable relatively to each other so as to move said cut outs out of alinement with each other, and a coupling between the members, said coupling having a plurality of spaced projections, one of said projections being movably receivable by the opening of one member and the other projection being movable through the cut outs in the aligned position thereof to be movably received in the opening of the other member, whereby said lips prevent retraction of either projection in the position of the cut outs out of alinement with each other, and the space between said lips being insufficient for passage of a projection therebetween.

4. A device including a plurality of threadedly interengaged members, and means coaxial therewith and having a frangible portion and limited lost motion engagement in opposite directions with the different members, such that said means is movable in one direction to actuate one of said members to vary the threaded engagement, and in the opposite direction to cause breakage of said frangible portion of one of the members having means coaxial with the first named means to cause the breakage of said frangible portion, as stated.

5. A device including a plurality of interengaged members relatively angularly movable to each other, and means coaxial with the members and having means to cause limited angular lost motion engagement with the different members, the path of said engagement with one of the members being angularly offset relatively to that with the other member, the first mentioned means being movable in one direction to effect the engagement between the members and in an opposite direction to effect a locking interengagement between said means and one of said members, one of the members having a projection, and said means including means coaxial with said projections so that said locking interengagement is broken upon movement of the first mentioned means in said opposite direction.

6. A device including a plurality of threadedly interengaged members, and means having a frangible portion, said means being coaxial with said members and the latter and said means having elements for limited lost motion engagement

in opposite directions of said means with the different members, said means being releasable from said lost motion engagement with said members in a predetermined relative angular position of the members, said means being movable in one direction to actuate one of said members to vary the extent of the threaded engagement and to move said member away from said predetermined relative position to a different relative position of the members, said means being locked to said members by the elements in the different relative position of the members, and said means being movable in an opposite direction to cause engagement of the frangible portion and one of the members so as to break said frangible portion.

7. A device including a plurality of interengaged members relatively angularly movable to each other, and means coaxial with the members and having limited angular lost motion engagement with the different members, the path of said engagement with one of the members being angularly offset relatively to that with the other member, said means being movable in one direction to affect the engagement between the members and in an opposite direction to affect a locking interengagement between said means and one of said members, and said means including means such that said locking interengagement is broken upon movement of the first mentioned means in said opposite direction, and said means and members having elements whereby the said lost motion engagements are obtained, said elements being releasable in a predetermined relative angular position of the members to each other to permit removal of said means from said members, and said elements being maintained against disengagement upon movement of one said members by said means to a different relative position of the members.

8. A device including a container having a wedge like shoulder, a closure member for the container, a sealing member enclosing the closure member, and means irremovably securing the sealing member in the enclosing position thereof, the securing means including elements interengaging the members for a lost motion connection, the members being coaxial and the path of the lost motion engagement being substantially parallel to said axis, and there being a clearance between the members, the sealing member having a frangible portion in proximity to said shoulder, so that the frangible portion is broken by the shoulder on causing said movement of the sealing member toward the container by an impact on the sealing member.

9. A device including a container member, a closure member rotatably connected therewith, a sealing member around the closure member, the container and closure and sealing members having elements adapted for locking with each other, the sealing member being angularly movable along a path to cause the closure member to move as a result of actuation of elements between the closure and sealing members for causing said elements to lock and prevent removal of the sealing member, and the sealing member being movable along a different path, and the sealing and container members having means actuable by movement of the sealing member along said different path to break the sealing member for removal thereof.

10. A device including a container having a shoulder, a closure member connected to the container, a sealing member enclosing the closure member, said sealing member having a frangible

portion, said sealing member being engaged with the closure member for angular and limited axial movement so as to prevent axial removal of the sealing member, and said shoulder engaging said frangible portion upon axial movement of said sealing member, so that an axial impact on the sealing member causes said frangible portion to be broken by said shoulder without affecting the closure member.

11. A device including a container member having a wedge like shoulder, a closure member for the container, a sealing member enclosing the closure member, said members having portions movable relatively to each other with the portions on the container and closure members contacting to lock the portion on the sealing member to prevent removal of the sealing member and permitting movement of the sealing member along a path in coaxial relation with the closure member, said sealing member having a frangible portion adapted to be broken on said shoulder on moving the sealing member along said path toward the container.

12. A device including a container member, a closure member, rotatably connected therewith, a sealing member enclosing the closure member, said members having elements adapted for interlocking with each other, the sealing member being angularly movable and having means to cause angular movement of the closure member to shift the element of the closure member relative to the element of the container member so as to lock the element of the sealing member and prevent removal of the latter.

13. A device including a container member, a sealing member therefor angularly movable relative thereto, an intermediate member between the container and sealing members, the different members having elements adapted to interlock to secure the sealing member on the container member, the intermediate member being connected to one of the other members for angular movement, one of the sealing and container members having means to cause a movement of the intermediate member to effect an interlocking engagement of the element thereof with the elements of the sealing and container members to secure the sealing member on the container member.

14. A device including a container, closure and sealing members having portions providing removable aligned tongue and groove engagement between the sealing member and the container and closure members, individually, the closure

member being movable to move its portion out of said aligned relation to lock the portion of the sealing member and prevent removal thereof from the container.

15. A device including a container member, a sealing member engageable therewith for relative axial movement, a locking member, the different members having elements adapted to register with each other in an axial direction, the locking member being angularly movable to cause its element to move out of the position of register to prevent disengagement of the different elements so as to secure the sealing member on the container member, the sealing member having a frangible portion and the container member having means to cause breakage of the frangible portion upon continued movement of the sealing member.

16. A device including a container member, a closure member threadedly connected therewith, a sealing member enclosing the closure member, said members having elements adapted to register with each other in an axial direction and to lock said sealing member on said container member, the sealing member being angularly movable and having means to cause angular movement of the closure member to shift the element of the closure member relative to the element of the container member so as to lock the element of the sealing member and prevent removal of the latter, said closure member having its threaded connection with the container member tightened upon actuation by the sealing member.

17. A device including a container member, a closure member threadedly connected therewith, a sealing member enclosing the closure member, said three members having elements adapted to register and thereafter lock said sealing member to said container member, the sealing member being angularly movable and having means to cause angular movement of the closure member to shift the element of the closure member relative to the element of the container member so as to lock the element of the sealing member and prevent removal of the latter from the container member without breaking a frangible portion thereof, said closure member having its threaded connection with the container member tightened upon actuation by the sealing member, the sealing member having a frangible portion, and one of said other members having means to cause breakage of the frangible portion.

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