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H. O. WILSON

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LATCH

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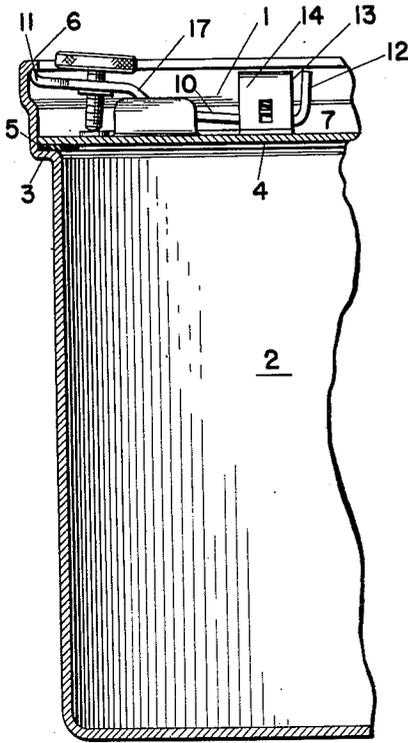


FIG. 1

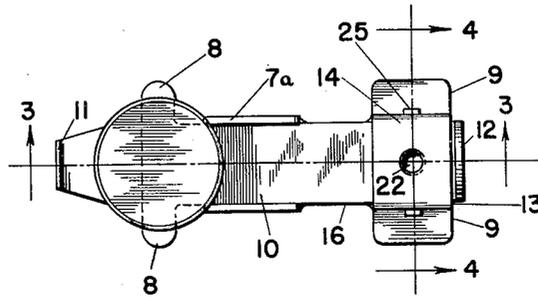


FIG. 2

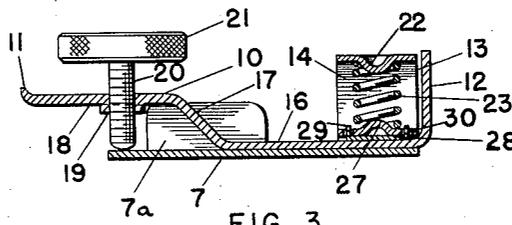


FIG. 3

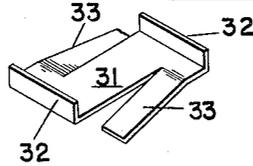


FIG. 4

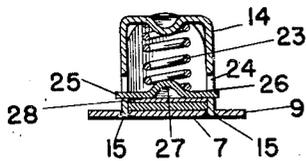


FIG. 5

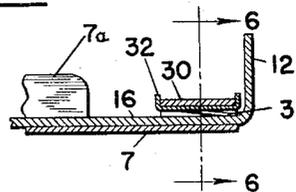


FIG. 6

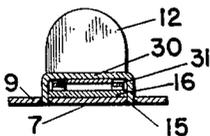


FIG. 7

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LATCH

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7 Claims. (Cl. 220—55)

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This invention relates generally to latch mechanisms, and particularly to latch mechanisms for retaining a closure member securely with respect to a container.

It is an object of the invention to provide a latch mechanism for closure members which shall be subject to quick and easy latching and unlatching without the use of tools.

It is a further object of the invention to provide a latch mechanism for closure members which shall be capable of exerting extreme pressures against the closure member in response to manual operation.

It is still a further object of the invention to provide a manually operable latch for use in conjunction with closure members for effecting water tight seals.

It is another object of the invention to provide a spring loaded latch of novel construction and operating in accordance with novel principles.

It is still another object of the invention to provide dogging means for water tight closures, utilization of which shall enable ready and rapid application and removal of such closures.

A further object of the invention resides in the provision of a compact latching mechanism, which shall minimize the total space required for the mechanism, and which shall be susceptible of combination with containers in such manner as to effect maximum utilization of space when combining a plurality of containers in a single area.

Still a further object of the invention comprises the provision of a latching mechanism which is restricted in its space requirements, and which when combined with a container for closure purposes requires no increase in lateral dimensions occupied by the container.

Briefly described, my invention consists of a latching, locking or dogging mechanism, one or more of which may be secured to a closure member of a container, as by welding, and which enables the application of considerable pressure between the closure member and the container by simple turning of a thumb screw, the latching mechanism being provided with a slidable member having a protruding lip at one end, and a retaining member at the other, the latter being spring loaded in one embodiment of the invention, and unloaded in another, and the protruding lip engaging an under side of a projection forming part of or secured to the container, and being pressed into engagement therewith by turning of the thumb screw, the latter passing threadedly through the slidable member at a

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point intermediate the lip and the retaining member and bearing against the container. By positioning the thumb screw in the sliding member in a position closer to the lip than to the retaining member, a considerable mechanical advantage is obtainable, the lip forming, when engaged with the projection associated with the container, the fulcrum of a lever to which force is applied by the screw, and the lip being readily disengageable from the projection when screw pressure is removed, by a simple sliding motion of the slidable member.

In the known prior art, water tight closures are effected by dogging down a closure member, such as a cover or a hatch or the like, with a plurality of screw down dogs, the closure member being held down by direct application of a force generated by a nut rotating threadedly on a bolt. In order to obtain considerable closure pressure, with mechanism of the above character, considerable force must be applied to the nut, and where, as is usual, a plurality of dogs is utilized for securing a cover member or a hatch, considerable difficulty is encountered in removing the dogs, since release of pressure at some points by release of pressure on some of the dogs, results in springing of the cover and consequent binding of the remaining dogs. Practically, in order to release a cover or hatch secured by conventional bolt type dogs, it has been necessary to release pressure in substantially equal steps applied to all the dogs, working off the pressure gradually and simultaneously at all points. This is a time consuming process and a troublesome and delicate one, and failure to release pressure equally on all dogs is common despite care taken in the process, resulting in the aforementioned binding effect.

Time consumption and the requirement of care in a cover releasing operation is of particular consequence, where the dogged container contains gear which is subject to maintenance, and wherein maintenance must be effected rapidly. An example is to be found in electronic devices contained in water-proof housing, and utilized by the Armed Forces under battle conditions. Such gear must be maintained in a sealed housing or container, but must be susceptible of practically instantaneous access upon failure, and after maintenance is completed must be susceptible of rapid re-enclosure.

A further important and outstanding feature of the present invention resides in that the latches are secured to the closure and do not project therebeyond, which makes for a clean case

having no mechanisms overlapping its side walls. This enables maximum utilization of storage space. The construction of the latches, further, is such that minimum height is occupied thereby, so that the height of cases equipped with my invention is not unduly extended.

It is to containers and closures for gear of the above character, that my invention finds primary and important application, although I wish it to be understood that other applications, features and advantages will readily suggest themselves to those skilled in the pertinent art.

The above features and advantages of my latch may be summarized as follows:

1. Latches are mounted on the closure member, which assures a container or case with clean side walls, minimizing loss of volume.

2. The use of spring loading assures that gasket set will be taken up.

3. The use of spring loading reduces time required for locking and unlocking the latch since in locking it is required only to take up the spring load.

4. The latches may be readily inspected for determination of whether the latches are engaged, disengaged, tight, or loose.

5. For mechanical or dust protection covers may be secured by a minimum of latches; in many cases, two latches suffice.

For a better and more complete understanding of the invention, and of further features, objects and applications thereof, reference may now be had to the following detailed description of two specific embodiments of the invention, in which reference is made to the accompanying drawings, wherein the same reference numerals are applied to identical parts in the several views, and wherein:

Figure 1 is a vertical section taken through a container or receptacle having a water tight closure, and showing the application of my novel latching mechanism thereto;

Figure 2 is a plan view of an embodiment of my invention;

Figure 3 is a longitudinal vertical section taken on the line 3—3 of Figure 2;

Figure 4 is a transverse vertical section taken on the line 4—4 of Figure 2;

Figure 5 is a fragmentary view, in longitudinal and vertical section, of a modification of the embodiment of Figures 2 to 4 inclusive;

Figure 6 is a transverse vertical section taken on the line 6—6 of Figure 5; and

Figure 7 is a view in perspective of a detail of Figures 5 and 6.

Referring now specifically to the drawings, and particularly to Figures 1—4 thereof, there is illustrated a latch 1 constructed in accordance with the invention and applied to a case or container 2. The container or case 2 may be of any desired shape, and usually will be of metallic construction, and is provided with a flange 3 at an open wall thereof which serves to support a cover or closure member 4. Intermediate the flange 3 and the closure member 4 may be provided a gasket 5, fabricated of rubber, cork, or the like, which serves in response to pressure of the closure member 4 against the flange 3 to effect a water tight sealing of the container 2. It is the function of the latch 1 to exert force against the closure member 4, and, in order to provide an anchor for the latch 1, the walls of the container 2, are extended beyond the flange 3, and provided with an inwardly extending lip 6.

The latch 1 is welded to the closure member 4, or otherwise secured thereto, and for this purpose is provided with a flat metallic base member 7 having lateral projections 8 and 9, which are readily available for the application of welding tools.

A slidable member 10 is provided as part of the latch 1, which is constructed at its forward end with an upwardly curving lip 11, the latter serving to impinge upon the under side of the inwardly extending lip 6 when the latch is in operative position, as shown in Figure 1. The rearward end 12 of the sliding member 10 is bent upwardly at right angles to the closure member 4, and serves as a stop, determining the limit of forward movement of the slidable member 10 by impinging upon the rearward edge 13 of a U-shaped bracket 14 having its open end welded, or otherwise firmly secured, as at 15, to the base member 7, astride the slidable member 10.

The slidable member 10 includes a portion 16 extending rectilinearly for slightly more than half its length forwardly from the rearward end 12 thereof, which is perpendicular with the rearward and upwardly bent end 12. The rectilinear portion 16 is parallel to the base member 7 and slidable in contact therewith when the latch is in unlocked condition. Forwardly of the rectilinear portion 16 the slidable member rises on a slope of about 45°, as at 17, and thereafter extends in a direction parallel to the rectilinear portion 16 to the lip 6, as at 18, between a pair of guide members 7a.

The underside of the portion 18 of the slidable member 10 is provided with a nut 19, welded thereto, and provided with a threaded aperture which extends through portion 18, and which threadedly accommodates a thumb screw 20 having a head 21, the screw 20 resting against the base 7 so that rotation of the screw causes movement of slidable member 10.

The transverse wall of the U-shaped bracket 14 is provided with a depression 22, which nests internally of the upper end of a coil spring 23. The side walls of bracket 14 are provided with oppositely positioned slots 24 extending for a short distance from a position upwardly of the base member 7 and of the slidable member 10. Riding within the slots 24 are ears 25 extending laterally outwardly from a flat strip 26 which rides internally of the U-shaped bracket 14, and which is provided with a rise 27, centrally thereof, for engaging the under end of the coil spring 23. Intermediate the slidable member 10 and the flat strip 26 is a flat strip of soft metal 28, as brass or copper, which is secured against sliding motion by a pair of lugs 29 extending upwardly therefrom and through a pair of apertures 30 provided therefor in the flat strip 26.

In a locking operation, the slidable member 10 is pushed forward with respect to the base member 7, moving between guide members 7a, and the screw 20 is turned until the lip 11 engages the under side of the inward projection 6. Further rotation of the screw then causes slidable member 10 to pivot about the point of contact between screw 20 and base 7, the point 7 being retained substantially motionless, and the portion 16 of slidable member 10 rises against the expansive force of helical spring 23, compressing same. As the spring 23 is compressed it exerts greater and greater force downwardly against the rearward portion of slidable member 10, which is translated into upward pressure

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against projection 6, by lever action, the ultimate consequence being that a downward force is impressed on closure 4 equal to the pressure exerted by spring 23, multiplied by the mechanical advantage due to the difference in distance from screw 20 to lip 11, and from screw 20 to spring 23. The lugs 25, having but a limited possibility of travel in slots 24, determine the limit of compression of spring 23, beyond which the slidable member 10 is rigidly held at both point 11 and its rearward end. In normal operation this limit of travel is not exceeded.

In order to release the latch the screw head 21 is rotated in releasing sense until lip 11 loses contact with projection 6, at which time the slidable member 10 may be pulled rearwardly, removing lip 11 from its position under projection 6, and rendering the closure member 4 removable.

In practice a number of latches 1 are utilized in conjunction with any closure member, the exact number depending upon the size of the closure member and the service required. A closure member may be latched or locked in place to provide a water tight seal in a matter of but a few seconds, and released in an equally short period of time, no binding action being possible by reason of the resilience of spring 23, which acts to load the latch to an extent determined by its compression. No care is required with respect to the sequence in which the latches are unlocked, a feature of great value, particularly under trying conditions of manipulation.

A further preferred embodiment of my invention is illustrated in Figures 5 to 7 inclusive of the drawings, this embodiment being identical in almost all respects with that of Figures 1 to 4 inclusive, but departing therefrom in that substantially no spring loading is provided.

Referring particularly to Figures 5 and 6, it will be evident that the rearward portion 16 of slidable member 10 rides under a U-shaped bracket 30, which is welded to base 7, as at 15, in a manner and in a position identical with the bracket 18. The bracket 30, however, contains no slots and is of but slight height, just adequate to enable passage thereunder of the slidable member 10, and for the further accommodation of a light flat spring 31, shown in detail in Figure 7 of the drawings, and which has a pair of upstanding sides 32 formed by bending, which straddle the transverse member of U-shaped bracket 30, to prevent sliding motion of spring member 30. Slight pressure is exerted against the sliding member 10 by virtue of a pair of downwardly bent tongues 33, cut from the spring 31 and forming part thereof. The spring 31 functions primarily to prevent rattling, vibration, and undesired movement of the slidable member 10, serving to provide friction between slidable member 10 and bracket 30. Any loading provided by spring 30 is a secondary effect, and is of slight or no importance.

While the embodiment of Figures 1 to 4 inclusive is preferred over that of Figures 5 to 7 inclusive, by reason of its spring loading, the latter modification presents certain simplicities and economies of construction, which render it particularly desirable for many purposes. In operation, the species of Figures 5 to 7 inclusive is sufficiently similar to that of Figures 1 to 4 inclusive, that a detailed description thereof may be dispensed with.

While I have described two specific embodiments of my invention, it will be clear to those

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familiar with the pertinent art, that modifications in details of construction and arrangement of parts may be resorted to without departing from the true spirit and scope of the invention, as defined in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. In combination a base member, a member slidable with respect to said base member, means for restricting motion of said slidable member in respect to the path of said motion and the extent of said motion, means for actuating one portion of said slidable member in a direction substantially at right angles to the path of said motion and means for restraining motion of a further portion only of said slidable member against said motion substantially at right angles to the path of said motion.

2. The combination with a container having an aperture and a closure and a shoulder for supporting said closure to close said aperture and a lip externally of said aperture, of a latching mechanism having a base secured to said closure externally thereof and a double ended latch member guidedly movable with respect to said base, and means located intermediate the ends of said double ended latch member for pressing one end of said latch member against said lip for creating a separative force between said lip and said closure, whereby to press said closure against said shoulder, and means for spring loading the other end of said latch member to provide a force equal and opposite to said separative force.

3. The combination in accordance with claim 2 wherein is provided means for restricting movement of the other end of said latch member.

4. The combination in accordance with claim 3 wherein said means for pressing comprises a screw threadedly passing through said guidedly movable latch member and bearing against said closure.

5. A latching mechanism comprising a base member, means slidable with respect to said base member into and out of latching position, screw means for raising and lowering said slidable means into and out of locking position, said slidable member having two relatively remotely located end portions, said screw means threadedly engaging said slidable member at a point intermediate said end portions, means for securing one of said end portions against greater than a predetermined motion, and means for preventing translatory motion of said screw means.

6. A latching mechanism for a container comprising, a base member, a slidable latch movable parallel to the plane of said base member and having a latching end and a loading end, means tending to restrain said loading end against movement perpendicular to said base member, means for securing said latching end, and screw means located intermediate said latching end and said loading end tending to move said latch perpendicular to said base member, said screw means comprising a screw extending threadedly through said latch substantially perpendicular to said base member and bearing against said base member.

7. A latching mechanism for securing a closure with respect to an aperture, comprising, supporting means for said closure and anchor means, said closure being located intermediate said supporting means and said anchor means being in contact with said supporting means, a

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base for said latching mechanism, means for securing said base to said closure, a latch member for said latching mechanism engageable with said anchor means, and rotatable screw means actuatable for pressing said latch member against said anchor means in a direction tending to separate said base and said anchor means, whereby to press said closure against said supporting means, said rotatable screw means actuatable for pressing comprising a screw threadedly passing through said latch member and bearing against said closure, rotation of said screw pressing said latch member against said anchor means, said latch member comprising two ends, one of said ends engaging said anchor means, and means for restraining movement of the other end, said screw passing through said latch member intermediate said two ends.

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20 Number  
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