ABSTRACT

A One-out-of-two lock system comprising: a container having a first mating means within its interior surface, and also having a release channel within said surface; a cover assembly having peripheral dimensions suitable for effecting a flush fit of said cover assembly over the open end of said container; a first lock located within said cover assembly, said lock having a first engagement member, said engagement member disposed proximate to said first mating means and said engagement member having a retractable second mating means complementary to said first mating means, said second mating means lying within said first mating means only when said first lock is in a locked mode; and a second lock located within said cover assembly having a second engagement member, said second member disposed proximate to said first mating means, and said second member having a retractable third mating means complementary to said first mating means, said third mating means lying within said first mating means only when said second lock is in a locked mode, wherein said cover assembly is secured to said container by said second and third mating means both held within said first mating means whereby the actuation of either of said locks from a locked mode to an open mode will cause a retraction of that lock's mating means, thereby permitting a user to remove said cover assembly by moving said assembly until the unopened lock's mating means, which remains in its initial, unretracted position, is aligned with said release channel, and then by lifting said cover assembly up along the axis of said release channel.

8 Claims, 6 Drawing Figures
ONE-OUT-OF-TWO LOCK SYSTEM

The invention described herein may be manufactured, used, sold and licensed by or for the Government of the United States for governmental purposes without the payment to us of any royalty thereon.

BACKGROUND OF THE INVENTION

The present invention is the outgrowth of a long-existing need for a security container having a high reliability of authorized entry. Serious problems have been encountered where a security container specifically designed to render an unauthorized entry all but impossible, fails to open in response to an attempted authorized entry. Considerable difficulty and inconvenience generally result from such failures. Hence, the problem confronted by designers of security containers is that of increasing the reliability of authorized entry without increasing the possibility of unauthorized entry.

A new approach toward attaining this end is embodied in the instant invention. This approach is essentially one of increasing the number of independent lock mechanisms within the security container, thereby building a redundancy or fail-safe factor into the overall system.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a lock system possessing a high degree of ingress confidence without sacrifice of the system's security value. The prime operative principle utilized in the attainment of the above object can be mathematically illustrated as follows: Let \( r \) equal the functioning ingress reliability of a single lock. Then, the functioning reliability of a one-out-of-two lock system would be double the reliability of either individual lock minus the probability that both locks might fail simultaneously. This can be expressed mathematically as \( 2r - r^2 \). In numerical terms, the following table illustrates the increase in reliability that the one-out-of-two system yields as against a single lock:

<table>
<thead>
<tr>
<th>( 2r - r^2 )</th>
<th>.9999</th>
<th>.9975</th>
<th>.9900</th>
<th>.9600</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-out-of-two</td>
<td>.99</td>
<td>.95</td>
<td>.90</td>
<td>.80</td>
</tr>
</tbody>
</table>

The present invention comprises a container having a first mating means within its interior surface, and also having a release channel within said surface; a cover assembly having peripheral dimensions suitable for effecting a flush fit of said cover assembly over the open end of said container; a first lock located within said cover assembly, said lock having a first engagement member, said engagement member disposed proximate to said first mating means and said engagement member having a retractable second mating means complementary to said first mating means, said second mating means lying within said first mating means only when said first lock is in a locked mode; and a second lock located within said cover assembly having a second engagement member, said second member disposed proximate to said first mating means, and said second member having a retractable third mating means complementary to said first mating means, said third mating means lying within said first mating means only when said second lock is in a locked mode, wherein said cover assembly is secured to said container by said second and third mating means both held within said first mating means whereby the actuation of either of said locks from a locked mode to an open mode will cause a retraction of that lock's mating means, thereby permitting a user to remove said cover assembly by moving said assembly until the unopened lock's mating means, which remains in its initial, unretracted position, is aligned with said release channel, and then by lifting said cover assembly up along the axis of said release channel.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional front view of the One-out-of-two lock system.

FIG. 2 is a bottom view of FIG. 1 taken along line 2-2.

FIG. 3 is a cross-sectional front view illustrating the left-hand lock in its open position.

FIG. 4 is a bottom view of FIG. 3 taken along line 4-4.

FIG. 5 is a cross-sectional view illustrating the present lock system in a releasable mode.

FIG. 6 is a bottom view of FIG. 5 taken along line 6-6.

DETAILED DESCRIPTION OF THE INVENTION

The present one-out-of-two lock system comprises an open container 8 (see FIG. 1) having a peripheral annular groove 10 (see FIG. 2) machined into the interior surface 9 of the container. Said container also exhibits a vertical keyway 4, the width of which is defined by a segment of the peripheral annular groove 10. The length of the keyway 4 is defined by the distance between the lower horizontal face of the annular groove 10 and the top horizontal surface 11 at the open end of the container 8.

A cover assembly 7 having peripheral dimensions suitable for effecting a flush fit of said cover assembly over the open end of the container 8 is provided. Set within the cover assembly 7 is a first lock 1. This lock has, as an integral operative component, an engagement member 5 disposed in the same horizontal plane as the annular groove 10. The engagement member 5 exhibits a protruding segment 12, the width of which is less than the width of the vertical keyway 4. This segment 12 lies within the annular groove 10 only when the first lock 1 is in a locked mode.

Also set within the cover assembly 7 is a second lock 2. This lock, like lock 1, has an engagement member 5' which is disposed in the same horizontal plane as the annular groove 10. The engagement member 5' also exhibits a protruding segment 12' which, like segment 12, has a lesser width than the vertical keyway 4 and lies within the groove 10 only when the second lock 2 is in a locked mode.

Actuation of either of said locks from a locked mode to an open mode will cause a retraction of that lock's protruding segment into a slot 6. FIGS. 3 and 4 illustrate lock 1 in the open mode with its protruding segment 12 in a retracted position.

After the opening of either lock, removal of the cover assembly 7 is achieved through the rotation of the cover assembly until the protruding segment 12' is aligned with the vertical keyway 4. FIGS. 5 and 6 illus-
trate such an alignment. The cover is then lifted up along the longitudinal axis of the vertical keyway.

It should be noted that the two locks 1 and 2 need not necessarily operate by the same internal principles. They need only have the movable engagement members 5 and 5' as common features. However, as a matter of convenience, it would be easiest to use identical locks, preferably combination locks with the same combination.

Furthermore, a separate circular groove may be provided for each protruding segment 12 and 12'.

A U-shaped handle 3 may be affixed to the cover 7 in order to facilitate carrying of the complete container.

It is thus seen that the object, set forth in the Summary of the Invention, of providing a lock system possessing a high degree of ingress reliability without sacrifice of the system’s security value, is efficiently attained by the one-out-of-two lock device of the preceding description.

We wish it to be understood that we do not desire to be limited to the exact detail of construction shown and described for obvious modification will occur to persons skilled in the art.

Having described our invention, what we claim as new, useful and non-obvious and accordingly, by this instrument, secure by Letters Patent of the United States is:

1. A one-out-of-two lock system comprising:
   - a container having a first mating means within its interior surface, and also having a release channel within said surface;
   - a cover assembly having peripheral dimensions suitable for effecting a flush fit of said cover assembly over the open end of said container;
   - a first lock located within said cover assembly, said lock having a first engagement member, said engagement member disposed proximate to said first mating means and said engagement member having a retractable second mating means complementary to said first mating means, said second mating means lying within said first mating means only when said first lock is in a locked mode; and
   - a second lock located within said cover assembly having a second engagement member, said second member disposed proximate to said first mating means, and said second member having a retractable third mating means complementary to said first mating means, said third mating means lying within said first mating means only when said second lock is in a locked mode, wherein said cover assembly is secured to said container by said second and third mating means both held within said first mating means whereby the actuation of either of said locks from a locked mode to an open mode will cause a retraction of that lock's mating means, thereby permitting a user to remove said cover assembly by moving said assembly until the unopened lock’s mating means, which remains in its initial, unretracted position, is aligned with said release channel, and then by lifting said cover assembly up along the axis of said release channel.

2. The lock system as recited in claim 1 in which:
   - said first mating means comprises a peripheral annular groove;
   - said release channel comprises a vertical keyway;
   - said second mating means comprises a first protruding segment, the width of which is less than the width of said vertical keyway; and
   - said third mating means comprising a second protruding segment, the width of which is less than the width of said vertical keyway.

3. The lock system as recited in claim 2 in which said annular groove comprises a plurality of grooves, one for each lock.

4. The device as recited in claim 2 in which said first and second locks function by different internal principles.

5. The device as recited in claim 2 in which said first and second locks function by the same internal principle.

6. The device as recited in claim 4 in which said locks are both combination locks.

7. The device as recited in claim 5 in which said combination locks both have the same combination.

8. The device as recited in claim 6 in which said cover assembly has, attached to its outer horizontal surface, a U-shaped handle that serves to facilitate the carrying of said container.

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