

CASE LOCK

The present invention relates to a lock, and more particularly to a numerical lock.

5 A conventional case lock used for a suitcase or a trunk having upper and lower casing parts includes a lock body mounted on the lower casing part and a hooking plate mounted on the upper casing part so that when the lock body and the hooking plate are engaged
10 together, the case is locked. Such a structure has the following disadvantages:

1. Since the lock body and the hooking plate are respectively mounted on the lower and upper casings parts, the assembly procedure is relatively time-
15 consuming.

2. Both the lock body and the hooking plate will occupy some of the storage space provided by the case.

3. Since the hooking plate protrudes beyond
20 the edge of the upper casing part, it may hook or hurt a user's hand or the article in the course of a user taking the article from storage.

According to a first aspect of the invention, there is provided a lock comprising a housing having a
25 plurality of holes; a plurality of numerical wheels rotatably mounted in said housing and respectively protruding from said holes for rotation from outside of said housing; an actuating plate mounted in said

housing and movable between a first position when the wheels display a correct numerical combination and a second position when the wheels display an incorrect numerical combination; a hooking member pivotally
5 connected to said housing; a first resilient member mounted between said housing and said hooking member tending to urge them apart with a first predetermined included angle; a securing plate pivotally connected to said housing, the securing plate having a tongue end
10 and being adapted to be fixed to a body portion of a case having a cover portion having a part engageable by said hooking member; a second resilient member mounted between said housing and said securing plate tending to urge them apart with a second predetermined included
15 angle; means pivotally fixed to said housing, and having a first engaging portion for engaging with said tongue end of the securing plate and a second engaging portion engageable by said actuating plate when the hooking member engages with said part of the cover
20 portion of the case and the actuating plate is in said second position; and a third resilient member mounted between said housing and said engaging means tending to urge them in a pivoted relationship with respect to each other.

25 Preferred and/or optional features of the first aspect of the invention are set forth in claims 2 to 8, and the invention in a second aspect is set forth in claim 10.

The present invention may best be understood through the following description of the preferred embodiment with reference to the accompanying drawings, in which:

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Fig. 1 is an exploded view showing a preferred embodiment of a case lock according to the present invention;

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Fig. 2 is a perspective view showing an assembled case lock in Fig. 1 incorporated on a case;

Fig. 3 is a sectional view showing a numerical lock in Fig. 1 in an unlocked state;

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Fig. 4 is a schematic view showing the relative position between a housing and a hooking member of a case lock in Fig. 1; and

Figs. 5(A) & 5(B) are sectional views respectively showing a locked state and an unlocked state of a case lock in Fig. 1.

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Referring now to Figs. 1-5(B), a lock according to the present invention includes a housing 10, a numerical lock assembly 20, a hooking member 30, a securing plate 40 secured to a body portion 61 of a case 60 having a cover portion 62 having a hooking piece 63, and an engaging medium 50.

Housing 10 includes a face plate 11, two lateral side plates 12 respectively having two upper holes 121 and two lower holes 122, a lower space pivotally mounting therein engaging medium 50, a shallowed portion 14 on face plate 11 having three regularly spaced holes 15, two grooved portions 16 on face plate 11, and rivets 17. One of side plates 12 further includes a positioning hole 123, a shallowed portion 124, an arcuate groove 125, and further a positioning hole 126.

10 Numerical lock assembly 20 having been known in the prior art includes a housing 21, a resilient finger plate 22, a first compression spring 23, an actuating plate 24, numerical wheels 25, sleeve members 26, a second
15 compression spring 27, a shaft 28 and a number-changing initiator 29, in which axial projections 261 of sleeve members 26 are respectively kept in engagement with teeth 251 of numerical wheels 25 by spring 27 so that when numerical wheels 25 carrying therewith sleeve members 26 are respectively rotated to rest all the flattened
20 portions 262 of sleeve members 26 on actuating plate 24, spring 23 pivots actuating plate 24 to unlock the numerical lock assembly 20 and when any one of numerical wheels 25 is rotated to rest the arcuate portion 263 of the respective sleeve member 26 on actuating plate 24, actuating plate 24 is thereby pivoted to lock numerical

lock assembly 20 which is mounted in shallowed portion 14 to protrude numerical wheels 25 from holes 15 and has shaft 28 mounted between grooved portions 16 and housing 21 riveted to face plate 11 by rivets 17.

5 Hooking member 30 includes a hooking piece 31, two side plates 32 respectively having two holes 33 through which and holes 122 a pin 34 passes to pivotally connect together housing 10 and hooking member 30, and a space 35 defined among hooking piece 31 and side plates 32 and
10 capable of receiving therein face plate 11. One of side plates 32 includes a positioning hole 36 retaining therein an end 382 of a torsional spring 38 which is sleeved on pin 34 and received in shallowed portion 124 and has an opposite end 381 retained in positioning hole 126, and a
15 projection 37 guided in arcuate groove 125 in order to confine the range that hooking member 30 should be pivoted by spring 38 with respect to housing 10.

 Securing plate 40 includes threaded holes 41 through which screws can be screwed to body portion 61, a hole 42
20 passing therethrough number-changing piece 29 protruding beyond housing 21, a tongue end 43, and two hinging rings 44 through which and holes 121 a pin 45 passes to pivotally connect together securing plate 40 and housing 10. A torsional spring 46 is sleeved on pin 45 and includes two free ends 461, 462 respectively urging

against face plate 11 and securing plate 40 in order to tend to usually urging them apart with a predetermined included angle.

Engaging medium 50 includes a shaft hole 51 rotatably mounted to pin 34, a handle portion 52 for hand-operation, a first engaging portion 53 engagable with tongue end 43, a second engaging portion 54 engagable with actuating plate 24, and a receiving groove 55 receiving therein a torsional spring 56 which is sleeved on pin 34 and includes two free ends 561, 562 respectively retained in positioning hole 123 and groove 55 for usually tending to urge housing 10 and engaging medium 50 in a predetermined pivoted relationship with respect to each other.

In a locking state of the present lock, as shown in Fig. 5(A), second engaging portion 54 engages with actuating plate 24 and engaging medium 50 is thus prevented from being pivoted with respect to housing 10 so that hooking pieces 31, 63 hook together to thus lock the case 60. In an unlocked state of the present lock, as shown in Fig. 5(B), actuating plate 24 no longer stops against second engaging portion 54 so that engaging medium 50 can be pivoted to disengage first engaging portion 53 from tongue end 43 and thus torsional springs 38 & 46 will respectively pivot apart hooking member 30 and housing 10 as well as securing plate 50 and housing 10 to disengage

hooking piece 31 from hooking piece 63 to so unlock the case 60.

Certainly, torsional spring 56 can have its two free ends 561, 562 respectively retained in positioning hole 5 123 and groove 55 in the manner that housing 10 and engaging medium 50 are tended to be kept in the state shown in Fig. 5(A).



CLAIMS

1. A lock comprising:
 - a housing having a plurality of holes;
 - a plurality of numerical wheels rotatably
 - 5 mounted in said housing and respectively protruding from said holes for rotation from outside of said housing;
 - an actuating plate mounted in said housing and movable between a first position when the wheels display a correct numerical combination and a second position
 - 10 when the wheels display an incorrect numerical combination;
 - a hooking member pivotally connected to said housing;
 - a first resilient member mounted between said
 - 15 housing and said hooking member tending to urge them apart with a first predetermined included angle;
 - a securing plate pivotally connected to said housing, the securing plate having a tongue end and being adapted to be fixed to a body portion of a case
 - 20 having a cover portion having a part engageable by said hooking member;
 - a second resilient member mounted between said housing and said securing plate tending to urge them apart with a second predetermined included angle;
 - 25 means pivotally fixed to said housing, and having a first engaging portion for engaging with said tongue end of the securing plate and a second engaging portion engageable by said actuating plate when the



hooking member engages with said part of the cover portion of the case and the actuating plate is in said second position; and

a third resilient member mounted between said housing and said engaging means tending to urge them in a pivoted relationship with respect to each other.

2. A lock according to Claim 1, wherein said housing includes two first side plates and said hooking member includes two second side plates pivotally connecting therebetween said two first side plates.

3. A lock according to Claim 1 or Claim 2, wherein said engaging means includes a handle portion for allowing said engaging means to be rotated to engage together said first engaging portion and said tongue end if said case is to be re-locked after being unlocked.

4. A lock according to Claim 2, wherein one of said first side plates has an arcuate groove and an adjacent second side plate has a projection guided in said arcuate groove for defining said first predetermined included angle.

5. A lock according to any one of Claims 1 to 4, wherein said securing plate and said housing are pivotally connected by a first pin.

6. A lock according to Claim 5, wherein said second resilient member is a torsional spring mounted on said first pin.

7. A lock according to any one of Claims 1 to 6, wherein said engaging means and said housing are



pivotally connected together by a second pin.

8. A lock according to Claim 7, wherein said third resilient member is a torsional spring mounted on said second pin.

5 9. A lock substantially as hereinbefore described with reference to the accompanying drawings.

10. A lock comprising:

a housing having a plurality of holes;

a plurality of numerical wheels rotatably
10 mounted in said housing and respectively protruding from said holes for being rotated outside of said housing;

an actuating plate mounted in said housing and driven by said numerical wheels to have a first position
15 when they have correct numbers and a second position when they are in an incorrect number set;

a hooking member pivotally connected to said housing and having a first hooking piece;

a first resilient member mounted between said
20 housing and said hooking member for usually tending to urge them apart with a first predetermined included angle;

a securing plate pivotally connected to said housing, having a tongue end and adapted to be fixed to
25 body portion of a case having a cover portion having a second hooking piece engageable with said first hooking piece;

a second resilient member mounted between said

housing and said securing plate for usually tending to urge them apart with a second predetermined included angle;

engaging means pivotally fixed to said
5 housing, and having a first engaging portion engaging with said tongue end and a second engaging portion engageable with said actuating plate so that when said second engaging portion engages with said actuating plate in said second position, said first and second
10 hooking pieces hook with each other to thus lock said case; and

a third resilient member mounted between said housing and said engaging means for usually tending to urge them in a pivoted relationship with respect to each
15 other.

11. A case provided with a lock according to any one of the preceding claims.

