

SECURITY SEAL

TECHNICAL FIELD

5 A security seal for securely locking together 2 parts of a closing means to the opening of a container or bag is disclosed. The security seal is provided with features ensuring proper irreversible installation and displays tamper-evident features in the event of tampering.

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BACKGROUND ART

Many security seals are designed with a barb portion that is to be inserted into a seal chamber by forcibly pushing the barb portion's flexible
15 barb tips pass a narrow aperture, such that barb tips are retained in the chamber and cannot be withdrawn without tamper-evident signs such as deforming or breaking of the barb tips. U.S. Patent No. 5,884,949 (Leon) discloses a single-piece loop back type of security seal wherein the barb portion is provided at one end of the loop and the seal chamber at the other
20 end. A number of barb head designs is disclosed in this prior art.

Another type of seal is one that is insertable through a narrow aperture into a seal chamber which is formed by parts of a closing means to a

container's opening. An example of this type of seal is disclosed in U.S. Patent Publication No. 2005/0218664 (Hudson), wherein in addition to the barb tips to be flexed to pass through the seal chamber's aperture, the tip ends are biased or curved out-of-plane. This barb tip bias is only useful for the specific seal chamber configuration envisioned by Hudson so that the seal body assume a flat position upon secure insertion of the seal when the seal's elongated slot cooperates with a raised bar on the security device.

Scant attention has been paid to the frangible portion of the seal which is designed to be breakable to detach the barb portion from the seal body so that the lock on the security device is broken to allow for its opening. The frangible portion or stem is usually broken by lever action whereby the seal body is forcibly bent forward with the barb portion being retained in the chamber. In the locked position, the frangible portion – which is typically narrower than the aperture – usually leaves gaps in the aperture through which one may attempt to reach and pick at the barb tips, thus giving rise to a first weakness. A second weakness arise when tolerance between the frangible portion and the aperture allows the seal body to be bent forward to allow for ease of finger grip on the seal and to force it to bend and break at the frangible portion. This tolerance might expose gaps in the second dimension of the aperture thereby allowing picking space.

SUMMARY OF DISCLOSURE

Our present security seal endeavours to address the
aforementioned weaknesses by providing features which would close off the
5 gaps in either or both dimensions of the aperture. For ease of reference, the
relative positioning and parts of the seal shall be referred to herein in respect
of the seal being inserted into a seal chamber through an aperture in the top-
to-down direction, and the portions or parts of the seal be understood to be
relative to this direction and in such elevation view, although many other
10 possibilities of directions of insertions are possible depending on the seal
chamber's configuration.

In the general embodiment, we propose a security seal for use in
securely fastening a first member to a second member complementarily
15 forming a seal chamber upon complete closure of the first and second
members. The first and second members are integral with the respective
parts defining an opening to a container, wherein our security seal may be
irreversibly inserted through an aperture provided to at least one of the first
and second members, thereby preventing parting between the first and
20 second members from complete closure.

Our security seal comprises of a grip portion linked by a frangible
stem to a barb portion irreversibly insertable into the seal chamber through

the aperture. The barb portion comprises a first pair of barbs which tips
extending marginally wider than the aperture width, allowing compressive
flexure upon insertion past the aperture, and are frangible upon withdrawal.
The barb portion further comprises a second pair of barbs above the first pair
5 of barbs which, upon insertion of the first pair of barbs past the aperture, are
positioned to block remaining aperture space not already taken up by the
security seal.

In a first aspect of our security seal, the grip portion is detachable
10 from the barb portion by bending the grip portion forward to break the
frangible stem, leaving said broken off barbed portion in the seal chamber.
Preferably, the grip portion is provided with a tag or label, including any one
of bar code, serial number, RFID chip and like rapid security identification
reading or encoding means. Preferably still, the encoding means is
15 permanently imprinted onto the grip portion, including any one or
combination of laser burning a code or serial number, ultrasound fusing an
identification tag and like means. The grip portion is further preferably
provided with a depressed area complementarily shaped to an identification
tag to be permanently adhered thereunto by ultrasonic fusing or like means.

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In a second aspect of our seal, the tips of the first pair of barbs are
further biased out-of-plane in the backward direction. Preferably, the second
pair of barbs is provided to block remaining aperture space immediately after

passing through the aperture. In a preferred embodiment, the tips of the second pair of barbs are further biased out-of-plane in the backward direction. The third barb is preferably provided at the back of the barb portion at about the second barb's position.

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Our security seal may be used in a container which comprises a rectangular box secured by a cover slidable over an opening of rectangular box body wherein the first and second members are respectively integral with the body and cover. Alternatively, it may be used in a container comprises a bag having an opening provided by a zipper wherein the first and second members are respectively integral with the zipper's puller and top tape end.

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LIST OF ACCOMPANYING DRAWINGS

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The aforesaid features of our security seal and other advantages may be better understood with reference to the accompanying drawings and detailed description hereinafter in illustrating non-limiting implementation of our tamper-evident security seal on exemplary container, bag and the like, in which:

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FIGURE 1 (Prior Art) shows an example of a security box in which our proposed tamper-evident security seal may be used;

FIGURE 2 exemplify a bag with a zipper opening using a security device over the zipper's puller and top tape end in which our proposed tamper-evident security seal may be used;

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FIGURE 3 illustrates a front perspective view of our proposed security seal;

FIGURE 4 represents a back perspective view of our security seal;

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FIGURE 5 shows a side perspective view of our security seal; and

FIGURE 6 shows a side cross-sectional view of our security seal installed in a seal chamber of a security container.

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DETAILED DESCRIPTION OF SPECIFIC EMBODIMENT

Our proposed security seal is intended to be used with security devices generally which comprises of a first member and a second member that complementarily forms a seal chamber upon complete closure of the opening to a container which is to be understood as including any one of a security box, bag, pouch and the like. Our security seal is designed to be

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irreversibly inserted through an aperture provided through at least one of the members whereupon the seal's insertion, parting of the members is prevented without breaking the seal or showing signs of the seal having been tampered. Two examples of such box or bag in which our seal may be used
5 are shown in FIGURE 1 and FIGURE 2.

FIGURE 1 as the first example shows a container box wherein a slidable cover (12) forms a seal chamber (14) upon complete closure of the security box (16). A seal may be inserted through aperture (18) and prevents
10 the cover (12) from be slided out to open the box (16).

In the second example, as shown in FIGURE 2, a two-part security device is shown permanently installed upon a zipper's puller (22) and top tape end (24) respectively. The zipper may define the opening to a security
15 bag, pouch and the like. The seal chamber formed upon both parts being complementarily closed may be provided with an aperture (28) through which a seal (26) may be inserted therethrough to prevent the 2 parts from being separated or detached and therefore prevent the opening of the zipper.

20 The general embodiment of our invention, with collective reference to FIGURES 3, 4 and 5, which respectively shows a front, back and side perspective views of our seal, comprises of a grip portion (32) which is linked by a frangible stem (34) to a barb portion (36). The barb portion (36) is to be

irreversibly inserted into the seal chamber formed by the security device via aperture (18 or 28). The barb portion comprises of a first pair of barbs (40, 42) and a second pair of barbs (50, 52) above the first pair.

5 The first pair of barbs (40, 42) has its tips extend marginally wider than the aperture width so that, upon insertion, passing through the aperture will compress or flex the tips to enable the barb portion (36) to pass through the aperture. The tips and barbs are designed to be frangible such that any attempt to withdraw or pull the seal out of the aperture will cause
10 them to break or deformed thus showing tamper signs.

 As a preferred embodiment, the tips of the first pair of barbs (40, 42) are further biased out-of-plane in the backward direction. This backwards biased out-of-plane tips may be useful in providing a backwards
15 bias against a corresponding internal surface in the seal chamber so that the seal's grip portion (32) is levered to be biased backwardly to be flush against a corresponding external surface on the security device. In this preferred embodiment, any attempt to lift the grip portion (32) (forward or up, depending on the positioning of the security device) will cause the barbs to
20 start deforming and break.

 The second pair of barbs (50, 52) are provided above the first pair such that upon the complete insertion of the barb portion (36) of the seal, the

second pair of barbs (50, 52) are positioned in such manner as to block remaining aperture space not already taken up by the security seal such as the frangible stem (34). Preferably, this second pair of barbs (50, 52) blocks the remaining aperture space immediately after passing through the
5 aperture. Preferably still, the tips of this second pair of barbs (50, 52) are further biased out-of-plane in the backward direction as shown in the drawings.

We might cite 2 advantages provided by this backward out-of-plane
10 bias of the second pair of barbs: firstly, just as in the case of the first pair of barbs (40, 42), it contributes to the leveraging of the grip portion (32) to be flush against the back surface of the security device and thus prevent the grip portion to be lifted or bent forward to expose an aperture space remaining unoccupied by the seal. Secondly, in the event some space is
15 reveal, the backward bias of the tips would have covered such remaining space and thus thwarting any possibility of picking at the barb tips.

As a most preferred embodiment, a third barb (54) may be provided at the back of the barb portion (36) at about the second barb's (50, 52)
20 position. This third barb (54) accentuates the aforesaid 2 advantages plus any gaps that might be exposed as a result of manufacturing tolerance of the security device's aperture would still be blocked thereby.

Although the grip portion (32) is primarily for handling purposes, e.g. for ease of picking up by fingers and inserting into the aperture, it may also be optionally used for labelling or tagging purposes. For example, the grip portion (32) is provided with a tag or label, including any one of bar code, serial number, RFID chip and like rapid security identification reading or encoding means. The encoding means may be permanently imprinted onto the grip portion such as laser-burning a code or serial number thereon, or using ultrasound to fuse a pre-printed identification tag onto the grip portion.

When the seal is to be broken in order to open the container, the grip portion (32) may be grasped by fingers and bent forward to exert leverage moment against the frangible stem (34) to break it and thus detaching the grip portion (32) from the barb portion (36) which is left in the seal chamber. Depending on the design of the security device, the seal chamber is typically closed when the container's opening is fully closed so that the only access to the inside of the chamber is via the aperture.

INDUSTRIAL APPLICATION

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Our security seal may be used with a container comprises a rectangular box secured by a cover slidable over an opening of rectangular box body wherein the first and second members are respectively integral with

the body and cover. An example of such a security box is that disclosed in the Macau Application No. 1/000828 (Megafortris). Another example of application of our seal is a bag or pouch having an opening provided by a zipper wherein the first and second members are respectively integral with the zipper's puller and top tape end, such as that disclosed in US 6,533,335 (Hudson) and U.S. Design No. D-0448696 (Hudson).

There are many possible variations of the afore-described features and embodiments of the security seal which may not have been specifically mentioned or proposed but which a person having ordinary skill in the art would be able to adapt, vary, modify or improvise thereon based on the same working principle or notion. In addition, there may be many other alternative or optional features which may be used in conjunction with the barbs to enhance or improve their effectiveness but which may not have described herein. These and other adaptations, modifications or equivalents not specifically mentioned are to be understood as encompassed within the scope and letter of the claims hereinafter.

CLAIMS

1. A security seal for use in securely fastening a first member (12 or 22)
to a second member (16, 24) complementarily forming a seal chamber (14)
5 upon complete closure of said first and second members, said first and second
members being integral with respective parts defining an opening to a
container, wherein said security seal is irreversibly insertable through an
aperture (18) provided to at least one of said first and second members thereby
preventing parting between said first and second members upon said
10 complete closure,

characterised in that said security seal comprising:

- a grip portion (32) linked by
- a frangible stem (34) to
- a barb portion (36) irreversibly insertable into said seal chamber (14)

15 through said aperture (18), wherein said barb portion (36) comprising

- a first pair of barbs (40, 42) which tips
 - extending marginally wider than said aperture width,
 - allowing compressive flexure upon insertion past said
aperture (18), and are

- frangible upon withdrawal;
- a second pair of barbs (50, 52) above said first pair of barbs (40, 42)
which, upon insertion of said first pair of barbs past the aperture (18),
is positioned to block remaining aperture space not already taken
up by said security seal.

2. A security seal according to Claim 1 wherein the grip portion (32) is detachable from the barb portion by bending said grip portion (32) to break the frangible stem (34), leaving said broken off barbed portion (36) in the seal chamber (14).

3. A security seal according to Claim 1 wherein the grip portion (32) is provided with a tag or label, including any one of bar code, serial number, RFID chip and like rapid security identification reading or encoding means.

4. A security seal according to Claim 3 wherein the encoding means is permanently imprinted onto the grip portion (32), including any one or combination of laser burning a code or serial number, ultrasound fusing an identification tag and like means.

5. A security seal according to Claim 4 wherein the grip portion (32) is provided with a depressed area complementarily shaped to an identification tag to be permanently adhered thereunto by ultrasonic fusing or like means.

6. A security seal according to Claim 1 wherein the tips of the first pair of barbs (40, 42) are further biased out-of-plane in the backward direction.

7. A security seal according to Claim 1 wherein a third barb (54) is
5 provided at the back of the barb portion (36) at about the second barbs' (50, 52) position.

8. A security seal according to Claim 1 wherein the second pair of barbs (50, 52) are provided to block remaining aperture space immediately after
10 passing through said aperture (18).

9. A security seal according to Claim 8 wherein the tips of the second pair of barbs (50, 52) are further biased out-of-plane in the backward direction

10. A security seal according to Claim 9 wherein a third barb (54) is
15 provided at the back of the barb portion (36) at about the second barbs' (50, 52) position.

11. A security seal according to any one of Claims 1 – 10 for use in a
20 container comprises a rectangular box secured by a cover slidable over an opening of rectangular box body wherein the first and second members are respectively integral with said body and cover.

12. A security seal according to any one of Claims 1 – 10 for use in a container comprises a bag having an opening provided by a zipper wherein the first and second members are respectively integral with said zipper's puller and top tape end.