



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 154 392 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

14.11.2001 Bulletin 2001/46

(51) Int Cl.7: **G09F 3/03**

(21) Application number: **01201632.5**

(22) Date of filing: **03.05.2001**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: **06.05.2000 GB 0010865**

(71) Applicant: **Siemens Metering Limited**

Oldbury, Bracknell, Berkshire, RG12 8FZ (GB)

(72) Inventor: **Hampson, Stephen**

Oldham, OL4 4NW (GB)

(74) Representative:

**Humphrey-Evans, Edward John et al
Siemens Shared Services Limited,
I.P.D.,**

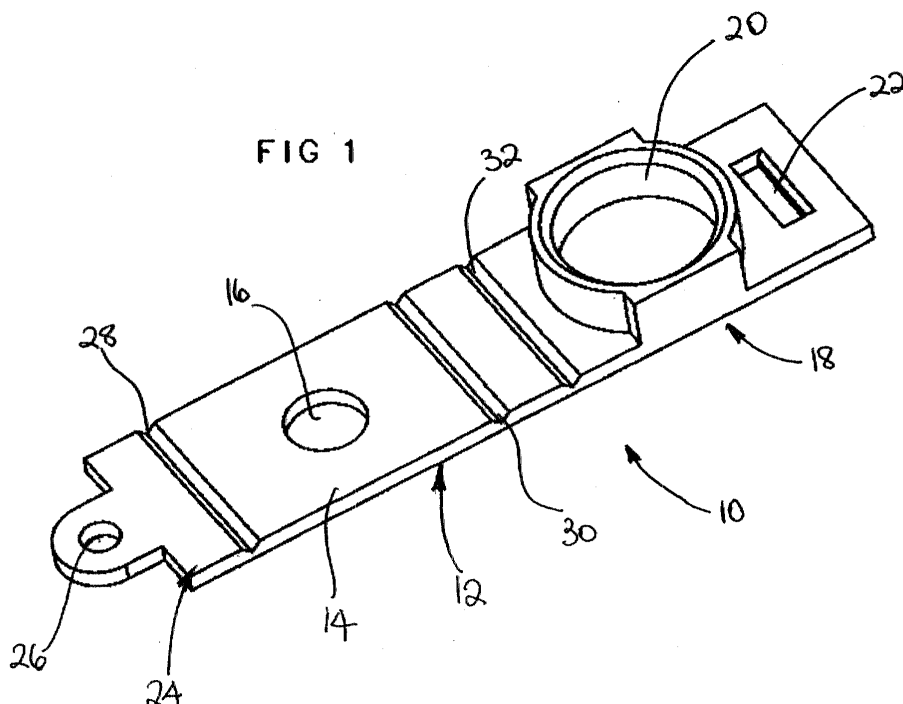
**Siemens House,
Oldbury**

Bracknell, Berkshire RG12 8FZ (GB)

(54) **Security seals**

(57) Described herein is a security seal (10) for sealing covers and/or doors. The seal (10) comprises a substantially flat strip of material which has a first hole (16) for receiving a screw for attaching the seal to a recess formed in a cover or door, a cap (20) for covering the head of the screw, a tab portion (24) having a second hole (26) formed therein and a slot (22) adjacent the cap (20). A hinge (28) is provided between the first hole (16)

and the tab portion (24) to allow the tab portion (24) to fold to a position to engage the slot (22). Two further hinges (30, 32) are provided between the first hole (16) and the cap (20) to allow the cap (20) to be folded over to cover the head of the screw and to allow the slot (22) to engage the tab portion (24). A sealing wire can then be passed through the second hole (26) to close the seal (10) in a tamper evident condition.



EP 1 154 392 A2

Description

[0001] The present invention relates to security seals and is more particularly, although not exclusively, concerned with the sealing of meter covers using screw arrangements.

[0002] It is known to fasten the covers or doors of equipment using screws. However, in many situations, these covers or doors need to be sealed to prevent unauthorised access to the equipment under the cover or door. One example of such equipment is an electricity meter.

[0003] In current electricity meters, a screw is used to secure a cover thereof and it is then sealed by passing Bowden cable through a cross-hole provided in the screw head and into a mating hole or slot in an adjacent portion of the cover and secured to restrict subsequent rotational movement of screw.

[0004] However, such security measures requires the screw to be cross-drilled to provide the location for the Bowden cable and hence such a screw becomes a non-standard, expensive item. Moreover, complex tooling is often required to provide the mating cross-hole or slot in the cover.

[0005] Whilst other methods of forming a cross-hole in cover can be achieved using simpler tooling, other problems are created relating to environmental sealing due to an opening being formed in the cover by the open/shut tooling.

[0006] As an alternative to the screw arrangement described above, two sealing tags may be used - one tag being fixed by the screw and the other being slotted into the fixed tag to cover a standard screw head, the tags being sealed with Bowden cable. However, in this case, the loose sealing tag can be misplaced when authorised opening of the cover takes place.

[0007] It is therefore an object of the present invention to provide an improved security seal which overcomes the problems described above.

[0008] In accordance with one aspect of the present invention, there is provided a security seal for a screw, the seal comprising:-

- a body portion having a first aperture formed therein through which the screw can be inserted;
- a tab portion connected to the body portion at one end thereof, the tab portion having a second aperture formed therein remote from the body portion; and
- a cap portion connected to the body portion at one end thereof, the cap portion having a third aperture formed therein remote from the body portion and being constructed so as to be folded over the body portion so that the third aperture engages the tab portion.

[0009] The tab portion may be connected to the body portion by means of a first hinge. Similarly, the cap portion may be connected to the body portion by means of at least a second hinge. It is preferred that the cap portion is connected to the body portion by means of a second and a third hinge.

tion may be connected to the body portion by means of at least a second hinge. It is preferred that the cap portion is connected to the body portion by means of a second and a third hinge.

[0010] Advantageously, the body portion, the tab portion and the cap portion are integrally formed, and may comprise a substantially flat strip of material. The strip of material comprises a plastics material, preferably, polypropylene.

[0011] The strip of material may be substantially elongate, and the body portion is substantially rectangular.

[0012] Wire means may further be provided for securing the cap portion over the body portion, the wire means passing through the second aperture over the cap portion after the tab portion has engaged the third aperture.

[0013] In accordance with another aspect of the present invention, there is provided an electricity meter comprising a housing and a cover, the cover having a recess in which a security seal as described above is located.

[0014] In accordance with a further aspect of the present invention, there is provided a method of securing a cover using a security seal as described above, the cover having a recess formed therein for receiving the seal, the method comprising the steps of:-

- placing the body portion of the seal over the recess; screwing the body portion into the recess thereby causing the tab portion and the cap portion to fold towards the body portion due to the presence of the recess;
- folding the cap portion over the body portion so that the third aperture engages the tab portion; and
- applying a sealing wire to the second aperture over the cap portion to close the seal.

[0015] For a better understanding of the present invention, reference will now be made, by way of example only, to the accompanying drawings in which:-

Figure 1 illustrates a seal in accordance with the present invention;

Figure 2 is a cross-sectional view through a portion of a cover, the seal of the present invention and a fixing screw in a first step of assembly of the seal in a deep recess formed in the cover;

Figure 3 is a cross-sectional view illustrating a further step of assembly of the seal in a deep recess;

Figure 4 is a cross-sectional view illustrating a final step of assembly of the seal in a deep recess;

Figures 5, 6 and 7 correspond respectively to Figures 2, 3 and 4 and illustrate how the seal of the present invention can be used on a cover of an electricity meter;

Figure 8 is a cross-sectional view through a portion of a cover, the seal of the present invention and a fixing screw in a first step of assembly of the seal in a shallow recess formed in the cover;

Figure 9 is a cross-sectional view illustrating a further step of assembly of the seal in a shallow recess; and

Figure 10 is a cross-sectional view illustrating a final step of assembly of the seal in a shallow recess.

[0016] Whilst the present invention will be described with reference to a security seal on an electricity meter, it will readily be appreciated that the seal of the present invention has applicability to many other situations where it is desired to seal a closure using a screw to prevent unauthorised access.

[0017] Figure 1 illustrates a seal 10 in accordance with the present invention. The seal 10 comprises a single integral moulding 12 having a body portion 14 with a hole 16, a cap portion 18 with a cap 20 and a slot 22, and a tab portion 24 with a hole 26 formed therein. Hinges 28, 30, 32 are also formed as shown using well-known injection moulding techniques.

[0018] In use, the hole 16 of body portion 14 receives a screw (not shown) and then, as the screw is tightened, the seal 10 is folded along hinge 28 and hinge 30 as the body portion 14 is drawn to the base of a recess (not shown). The cap portion 18 can then be folded over along hinge 32 so that the cap 20 thereof covers the screw head (not shown) and tab portion 24 is inserted into slot 22 of cap portion 18, such that hole 26 is above the slot 22, and sealing wire (not shown) can be inserted into hole 26 in the tab portion 24.

[0019] It will become apparent how the seal 10 of the present invention operates when described in more detail with reference to Figures 2 to 10.

[0020] Turning now to Figures 2 to 4, the assembly of the seal 10 of the present invention in a deep recess 40 in a cover portion 42 using a screw 44 will be described. The seal 10 is initially placed over the recess 40 such that the body portion 14 lies over the recess 40. Screw 44 is placed into hole 16 and screwed down into a hole 46 formed in the bottom of the recess 40 in the direction indicated by arrow 48. As the screw 44 is tightened, the body portion 14 of the seal 10 is drawn down towards the bottom of the recess 40. As this happens, tab portion 24 folds up in the direction indicated by arrow 50 along hinge 28, and cap portion 18 folds up in the direction indicated by arrow 52 along hinge 30. This folding action is produced by the shape of the recess 40. It is to be noted that the recess 40 also prevents rotation of the seal 10/screw 44 arrangement.

[0021] When the screw 44 has reached the end of its travel, the tab portion 24 is upstanding and is substantially perpendicular to body portion 14, as shown in Figure 3, and cap portion 18 is in a position, hinged about hinge 30, such that it can be folded along hinge 32 in the direction of arrow 54 so that cap 20 of cap portion 18 fits over head 56 of screw 44 and slot 22 fits over end 58 of the upstanding tab portion 24 with hole 26 being above the slot 22. The assembled seal 10 is shown in Figure 4 where a sealing wire 60 has been passed

through hole 26 to retain the cap portion 18 below the hole 26.

[0022] Figures 5 to 7 illustrate an electricity meter 70 having a housing 72 to which a cover 74 is which is to be sealed. The cover 74 corresponds to the cover 42 of Figures 2 to 4 and Figures 5 to 7 correspond to respective ones of Figures 2 to 4. As shown in Figure 5, the seal 10 is placed on the cover 74 over a recess therein (not shown). Screw 44 is tightened and the seal 10 folds along hinges 28 and 30 to the position shown in Figure 6 and the cap portion 18 is folded over along hinge 32 so that hole 26 of tab portion 24 extends through slot 22 so that the sealing wire 60 can be threaded through the hole 26 and sealed in a loop with a crimp 76 as shown in Figure 7.

[0023] The seal 10 of the present invention can also be used in a shallow recess 80 formed in a cover 82 as shown in Figures 8 to 10. The recess 80 has a hole 84 formed in its base for receiving a screw 86. The seal 10 is initially placed over the recess 80 such that the body portion 14 lies over the recess 80. Screw 86 is placed into hole 16 and screwed down into hole 84 formed in the bottom of the recess 80 in the direction indicated by arrow 88. As the screw 86 is tightened, the body portion 14 of the seal 10 is drawn down towards the bottom of the recess 80. As this happens, tab portion 24 folds up in the direction indicated by arrow 90 along hinge 28, and cap portion 18 folds up in the direction indicated by arrow 92 along hinge 30. Again, this folding action is produced by the shape of the recess 80.

[0024] When the screw 86 has reached the end of its travel, the tab portion 24 is upstanding and is substantially perpendicular to body portion 14, as shown in Figure 9, and cap portion 18 is in a position, hinged about hinge 30, such that it can be folded along hinge 32 in the direction of arrow 94 so that cap 20 of cap portion 18 fits over head 96 of screw 86 and slot 22 fits over end 58 of the upstanding tab portion 24 with hole 26 being above the slot 22. The assembled seal 10 is shown in Figure 10 where a sealing wire 60 has been passed through hole 26 to retain the cap portion 18 below the hole 26 as before.

[0025] It will readily be appreciated that the cap 20 of cap portion 18 is sized to accommodate the head of the screw used. In this case, the screw 44, 86 can be a conventional screw of a suitable length for the hole 46, 84 in the base of the recess 40, 80 formed in the cover 42, 82. For example, the screw 44, 86 may be a standard slotted cheese head screw.

[0026] It will also be appreciated that the depth of the recess within which the seal 10 of the present invention is to be used must be at least as deep as the thickness of the body portion 14 thereof. This has the effect of preventing access to the body portion 14 within the recess.

[0027] Advantageously, the body portion 14 of the seal 10 is substantially rectangular and fits within a substantially rectangular recess. However, it will be appreciated that any other suitable shape could be used for

the body portion 14 and/or recess with the proviso that rotation of the seal within the recess is to be prevented.

[0028] The seal of the present invention has the advantage that, in use, it is captive, that is, it is retained in its recess by the screw. Furthermore, the assembled seal provides an anti-tamper or tamper evident device.

[0029] The seal 10 can be made of any suitable thermoplastic material, for example, polypropylene, which allows the formation of the hinges 28, 30, 32 and which allows the hinges to be repeatedly flexed without fracturing. By using a thermoplastic material, the seal is simple and inexpensive to produce. Any standard screw can be used which makes it inexpensive compared with the cross-drilled screw described above.

[0030] It will be appreciated that materials other than thermoplastic materials may also be suitable for manufacturing the seal.

Claims

1. A security seal for a screw, the seal comprising:-

a body portion having a first aperture formed therein through which the screw can be inserted;

a tab portion connected to the body portion at one end thereof, the tab portion having a second aperture formed therein remote from the body portion; and

a cap portion connected to the body portion at one end thereof, the cap portion having a third aperture formed therein remote from the body portion and being constructed so as to be folded over the body portion so that the third aperture engages the tab portion.

2. A seal according to claim 1, wherein the tab portion is connected to the body portion by means of a first hinge.

3. A seal according to claim 1 or 2, wherein the cap portion is connected to the body portion by means of at least a second hinge.

4. A seal according to claim 3, wherein the cap portion is connected to the body portion by means of a third hinge.

5. A seal according to any one of the preceding claims, wherein the body portion, the tab portion and the cap portion are integrally formed.

6. A seal according to claim 5, wherein the body portion, the tab portion and the cap portion comprise a substantially flat strip of material.

7. A seal according to claim 5 or 6, wherein the strip

of material comprises a plastics material.

8. A seal according to claim 7, wherein the plastics material comprises polypropylene.

9. A seal according to any one of claims 6 to 8, wherein the strip of material is substantially elongate.

10. A seal according to claim 9, wherein the body portion is substantially rectangular.

11. A seal according to any one of the preceding claims, further comprising wire means for securing the cap portion over the body portion, the wire means passing through the second aperture over the cap portion after the tab portion has engaged the third aperture.

12. An electricity meter comprising a housing and a cover, the cover having a recess in which a security seal according to any one of the preceding claims is located.

13. A method of securing a cover using a security seal according to any one of claims 1 to 11, the cover having a recess formed therein for receiving the seal, the method comprising the steps of:-

placing the body portion of the seal over the recess;

screwing the body portion into the recess thereby causing the tab portion and the cap portion to fold towards the body portion due to the presence of the recess;

folding the cap portion over the body portion so that the third aperture engages the tab portion; and

applying a sealing wire to the second aperture over the cap portion to close the seal.

