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(54) **Tamper-evident closure**

(57) A tamper-evident closure comprises an envelope (10) having an opening (16) to its interior. A closure flap (20) is movable from an open condition in which access to the interior of the envelope can be reached through the opening (16) and a closed condition in which access to the interior of the envelope is substantially prevented. The closure includes a seal (90) applicable

to the envelope (10) in the closed condition, the presence of the seal preventing opening of the envelope. Removal of the seal causes the seal to be visibly damaged or broken as evidence of tampering. In a preferred embodiment, the seal is a one-piece plastic moulding that it co-operates with a seal receiving assembly (40) on a panel of the envelope and a seal locating assembly (42) on the flap (20).

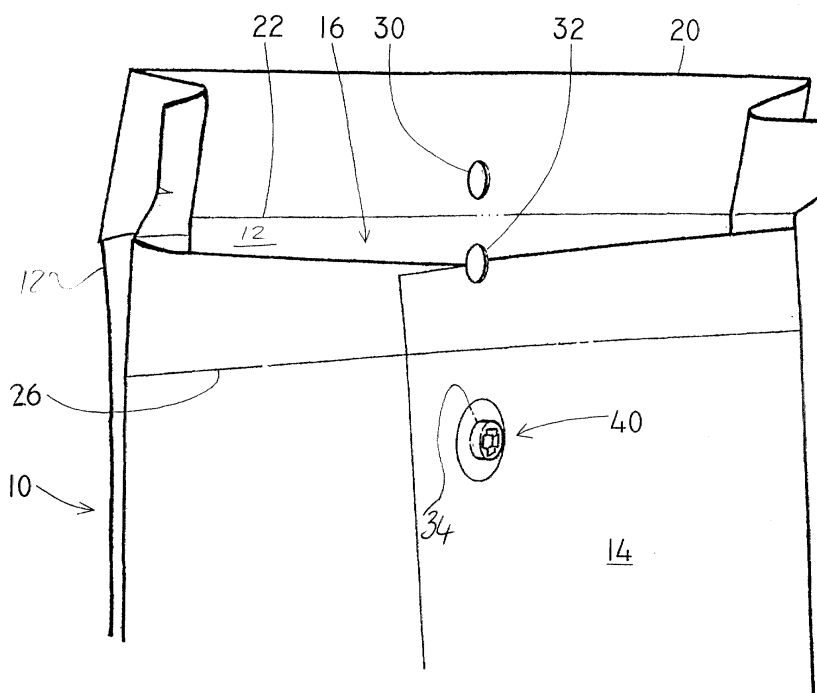


FIG 1

Description

[0001] The present invention relates to a tamper-evident closure.

[0002] Where documents of a sensitive or confidential nature are to be transported, they are often placed in a secure document pouch. Access to the interior of the pouch can be gained only through an opening that is closed by a fastener such as a strong "zip fastener". To close the pouch, a sliding element of the fastener is drawn towards one end of the fastener. A seal is then applied through a portion of the sliding element to locate on a cooperating formation that is secured to the material of the pouch. In order to reopen the pouch, the seal must be removed. The seal is constructed such that, upon removal, it is broken or permanently distorted in a manner that ensures it cannot be reapplied to the pouch. Therefore, when an intended recipient receives the pouch, it will be immediately apparent to the recipient if it has been opened because the seal will not be in place.

[0003] A disadvantage of known pouches is that their construction is complex and consequently expensive. They also possess not insignificant weight and bulk. An aim of this invention is to provide a similar level of tamper evidence in a closure of lighter and less expensive construction.

[0004] Therefore, from a first aspect, the invention provides a tamper-evident closure comprising an envelope having an opening, a closure element movable from an open condition in which access to the interior of the envelope can be reached through the opening and a closed condition in which access to the interior of the envelope is substantially prevented, wherein the closure includes a seal applicable to the envelope in the closed condition, the presence of the seal preventing opening of the envelope, and wherein removal of the seal causes the seal to be visibly damaged or broken.

[0005] Provided that a replacement seal cannot readily be obtained, any opening of the envelope is evidenced by the appearance of damage to the seal.

[0006] Most advantageously, the envelope is a re-usable envelope. For example, it may be formed from a folded blank. Although the envelope may be of paper, it is preferably of tough web material, such as woven high-density polyethylene, or reinforced paper.

[0007] A typical envelope of a tamper-evident closure embodying the invention includes an opening flap that can be moved between a closed configuration in which it covers an opening of the envelope and an open configuration in which it uncovers an opening of the envelope. In such embodiments, part of the seal, when applied, may pass through an aperture in the flap. In such embodiments, the seal, when applied, may be received by a seal receiving assembly carried on a panel of the envelope. Moreover, the seal, when applied, may be located on a seal locating assembly carried on the flap. Advantageously, the seal locating assembly includes a handling component to assist a user in grasping the seal

locating assembly in order to break the seal. This arrangement can provide a compact and easily-used closure.

[0008] In many embodiments of this invention, some arrangement must be provided whereby the envelope can display an address that can be changed when the envelope is to be re-used. This is especially useful in embodiments where the envelope component of the closure will be intended to be used many times. Therefore, in preferred embodiments, the envelope includes a display formation for displaying an address.

[0009] In an example of an embodiment according to the last-preceding paragraph, the display formation includes a viewing window in a panel of the envelope and a carrier for supporting an address card or letter incorporating an address within the envelope such that it is visible through the window. In principle, the window could be a simple aperture in a panel of the envelope. However, of preference, the window is closed by transparent or translucent material to protect the content of the envelope. In a preferred arrangement, the carrier comprises a sheet of web material secured to an inner surface of a panel of the envelope adjacent to the window. Such a sheet forms a pouch within the envelope in which an envelope card or letter incorporating address can be retained.

[0010] An embodiment of the invention will now be described in detail, by way of example, and with reference to the accompanying drawings, in which:

Figure 1 shows an opening region of a reusable envelope being a component of a closure embodying the invention, in an open configuration;

Figure 2 shows the opening region of Figure 1 in an intermediate, partially open configuration;

Figure 3 shows the opening region of Figure 1 in a closed condition with a tamper-evident seal applied;

Figures 4A, 4B and 4C are, respectively, underneath plan, plan and transverse sectional views of a first component of a seal locating assembly being a component of the closure embodying the invention;

Figures 5A, 5B and 5C are, respectively, plan, transverse section and rear views of a first component of a seal receiving assembly being a component of the closure embodying the invention;

Figures 6A and 6B are plan and side views of a seal being a component of the closure embodying the invention; and

Figures 7 and 8 show a blank for the envelope of Figure 1, respectively, in a flat and a partially folded condition.

[0011] With reference to the drawings, a closure embodying the invention comprises a gusseted envelope 10 formed from a folded blank (as shown in Figures 6 and 7) of tough, flexible web. In this embodiment, the web is formed from woven high-density polyethylene or reinforced paper. As will be recognised by those skilled in the technical field, these materials are already in use in the manufacture of strong envelopes, so the construction of the envelope 10 will be a matter of routine for manufacturers of such products.

[0012] The envelope 10 has an internal enclosed space defined between front and rear panels 12, 14 within which articles can be stored. At one end of the envelope, there is an opening 16 through which articles can be inserted into and removed from the space. The front panel 12 has an extension region that projects beyond the opening to form a closure flap 20 for the envelope.

[0013] The envelope 10 has an open configuration, as shown in Figure 1, in which the closure flap projects beyond the opening 16 as an elongation of the front panel 12. In this configuration, articles can be introduced into and removed from the enclosed space through the opening 16. In an intermediate configuration as shown in Figure 2, the flap 20 is folded along a first fold line 22 that is approximately coincident with an adjacent edge of the rear panel 14, such that the flap 20 passes across the opening to lie parallel and adjacent to the rear panel 14. In a closed condition, as shown in Figure 3, the triple-layered end region of the envelope, which is formed by the overlaying front and rear panels 12, 14 and the flap 20, is itself folded about a second fold line 26 to lie adjacent to the rear panel 14. In the closed condition, the opening 16 is substantially inaccessible, so that articles can neither be introduced into nor be removed from the enclosed space. The sequence of configurations described above, from open to closed, is shown sequentially in the figures 1 to 3.

[0014] A first hole 30 of circular shape is formed approximately centrally through the flap 20. A second through hole 32 of similar size and shape is formed through the front and rear panels 12, 14. The first and second holes 30, 32 and the first fold line 22 are disposed such that the holes 30, 32 align with one another when the flap is folded to its intermediate configuration of Figure 2. A third through hole 34 is formed in the rear panel 14. The third through hole 34 and the second fold line 26 are positioned such that the first and second holes 30, 32 align with the third through hole 34 when the envelope is in the closed configuration depicted in Figure 3.

[0015] A seal receiving assembly 40, which will be described in further detail below, is carried on the rear panel 14, with a component of the assembly 40 passing through the third through hole 34 to secure the assembly 40 in place on the rear panel 14. Similarly, a seal locating assembly 42 is carried on the folded-over portion 20a of the front panel 12, with a component of the assembly passing through the first through hole 30 to secure the

assembly 42 in place on the said folded over portion 20a.

[0016] With reference now to figures 5A to 5C, the seal receiving assembly 40 includes two components: a receiving element 50 and a securing washer 52, each of these components being formed as a one-piece plastic moulding.

[0017] The receiving element 50 has a thin annular peripheral portion 54, a radially outer region of which tapers in thickness. From a central region of the receiving element a boss 56 projects axially. The boss 56 has a generally circular peripheral cross section. A small portion of the boss adjacent to the annular portion 54 is of comparatively larger diameter than the rest of the boss, the change in diameter occurring at an external shoulder 58 of the boss 56.

[0018] A passage 60 extends axially through the boss 56. The passage has internal formations including two barbs 62 that project transversely into the passage 60. These formations interact with a seal, as will be discussed in due course.

[0019] The securing washer 52 is annular in section and a radially outer region of which tapers in thickness. The central hole of the annular section is of diameter slightly greater than the larger diameter portion of the boss 56.

[0020] The receiving element 50 is disposed on the rear panel of the envelope within the enclosed space of the envelope and with the boss 56 projecting outwardly through the third hole 34. The size of the third hole 34 is selected such that the boss is a close fit within it. The securing washer 52 is disposed on the outer surface of the rear panel 14 with its central hole surrounding the projecting part of the boss 56. The washer is constructed to be clipped over the boss with a snap-action.

[0021] With reference to Figures 4A to 4C, the seal locating assembly comprises a seal locating element 66 and a washer, not shown but similar to that described above with reference to Figures 5A to 5C. Each of these components is formed as a one-piece plastic moulding.

[0022] The seal locating element 66 includes a body portion 70 and a lifting tab portion 72. In plan, the body portion has a generally circular peripheral shape. The lifting tab portion 72 extends as a thin radial projection from the body 70. An end part of the lifting tab 72 is rounded and provided with ribs 74 embossed into one surface. The ribs assist a user in gripping the lifting tab 72, and increase its flexibility in the region where the ribs are provided.

[0023] The lifting tab 72 extends in a plane that coincides with a base plane of the body portion 70. The body portion 70 has a side wall that extends upwardly from the base plane and curves inwardly towards an axial centre line of the body portion 70 to meet with an upper surface of the body portion 70. A cylindrical formation 78 with an uppermost projecting formation 82 of hollow cylindrical form opens at a circular aperture 80 in the upper surface. This cylindrical formation 82 extends ax-

ially through the body portion, to project as shown in Figure 4C a short distance beyond the base plane. In order to provide for a snap-fitting engagement to the co-operating washer (not shown) the projecting formation may further include a circumferential rib (not shown) over which its retaining water can be press-fitted.

[0024] A generally cylindrical recess 84 is formed in the upper surface of the body portion, surrounding the circular aperture 80. The recess 84 has a small projecting region 86 that extends in a direction outwardly from the aperture 80.

[0025] The seal locating element 66 is disposed on the portion 20a with its base plane in contact with the material of the said portion 20a. That part of the cylindrical formation 78 that extends beyond the base plane is passed through the first hole 30 and to secure the seal locating element 66 in place on the portion 20a, a washer is clipped on to the protruding end of the formation 78 with a snap action, in the manner described above with reference to the seal receiving assembly of Figures 5A to 5C. The lifting tab 72 extends away from the first fold line 22.

[0026] With reference now to Figures 6A and 6B, a seal 90 for use with the invention is formed as a one-piece plastic moulding. The seal 90 has a head portion 92 and an attachment portion 94. The exact form of the seal is not central to the invention. However, the functional requirements are that the attachment portion 94 can be inserted into the passage 60 of the receiving element 50. Moreover, the attachment portion 94 has locating formations 96 that interengage with formations including the barbs 62 of the receiving element in a manner that the attachment portion 94 can be inserted into the passage 60 but cannot readily be removed therefrom. Interconnection between the head portion 92 and the attachment portion 94 is weak so that any attempt to remove the attachment portion 94 from the passage 60 will cause the head 92 and the attachment portion 94 to part.

[0027] The head 92 of the seal 90 has a peripheral shape that can fit closely within the recess 84 of the seal locating element 66. In particular, it is shaped to have a projecting formation 98 that fits closely within the projecting region 86 to ensure that the seal can be inserted into the seal locating element 66 in just one angular position.

[0028] As will be understood, when the envelope is in the closed condition, the seal 90 can be inserted through the seal locating element 66 into the receiving element 50 wherein it is retained. In this condition, the envelope cannot be opened. In order to open the envelope, a user must grasp the lifting tab 27 and pull it. This causes the seal 90 to break. The envelope can then be readily opened, but it is immediately obvious that the seal 90 has been broken.

[0029] An envelope for use in embodiments of the invention can, as discussed above, be formed by folding and gluing a flat blank of web material. This is a type of

construction for an envelope that is well known. A suitable blank 120 is shown in Figure 7.

[0030] In order that an envelope embodying the invention can readily be used many times, it is provided with means for displaying an address that can readily and repeatedly be changed throughout the useful life of the envelope. The front panel 12 of the envelope includes a window (not shown), optionally closed by transparent or translucent material. Inwardly of the window, on the inner surface of the front panel 12, a rectangular sheet 122 of web material is secured to the inner surface of the front panel 12. The sheet 122, which is larger in extent than the window, is secured to the panel 12 by adhesive around three edge regions. The fourth edge region is free from adhesive and is disposed adjacent to the edge of the front panel 12 that borders the envelope's opening. This arrangement provides a pocket on the inside of the envelope.

[0031] For use, a card 124 or letter having an address written or printed on a display surface is inserted into the pocket so that the address is disposed adjacent to the window, whereupon the address is visible through the window. In many applications, an envelope will repeatedly travel in return journeys between two destinations. In such cases, the addresses of the two recipients may conveniently be printed on opposite sides of the card 124. The window may however be made sufficiently large to display a prepaid postal impression printed on the card or letter.

Claims

1. A tamper-evident closure comprising an envelope having an opening, a closure element movable from an open condition in which access to the interior of the envelope can be reached through the opening and a closed condition in which access to the interior of the envelope is substantially prevented, wherein the closure includes a seal applicable to the envelope in the closed condition, the presence of the seal preventing opening of the envelope, and wherein removal of the seal causes the seal to be visibly damaged or broken.
2. A tamper-evident closure according to claim 1 in which the envelope is a re-usable envelope.
3. A tamper-evident closure according to claim 2 in which the envelope is formed from a folded blank of tough web material.
4. A tamper-evident closure according to claim 3 in which the web material is woven high-density polyethylene or reinforced paper.
5. A tamper-evident closure according to any preceding claim in which the envelope includes an opening

flap which can be moved between a closed configuration in which it covers an opening of the envelope and an open configuration in which it uncovers an opening of the envelope.

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6. A tamper evident closure according to claim 5 in which a part of the seal, when applied, passes through an aperture in the flap.
7. A tamper evident closure according to claim 6 in which the seal, when applied, is received by a seal receiving assembly carried on a panel of the envelope. 10
8. A tamper-evident closure according to claim 5 or claim 6 in which the seal, when applied, is located on a seal locating assembly carried on the flap. 15
9. A tamper-evident closure according to claim 8 in which the seal locating assembly includes a handling component to assist a user in grasping the seal locating assembly in order to break the seal. 20
10. A tamper-evident closure according to any preceding claim in which the envelope includes a display formation for displaying an address. 25
11. A tamper-evident closure according to claim 10 in which the display formation includes a viewing window in a panel of the envelope and a carrier for supporting an address card or letter incorporating an address within the envelope such that it is visible through the window. 30
12. A tamper-evident closure according to claim 11 in which the window is closed by transparent or translucent material. 35
13. A tamper-evident closure according to claim 11 or claim 12 in which the carrier comprises a sheet of web material secured to an inner surface of a panel of the envelope adjacent to the window. 40

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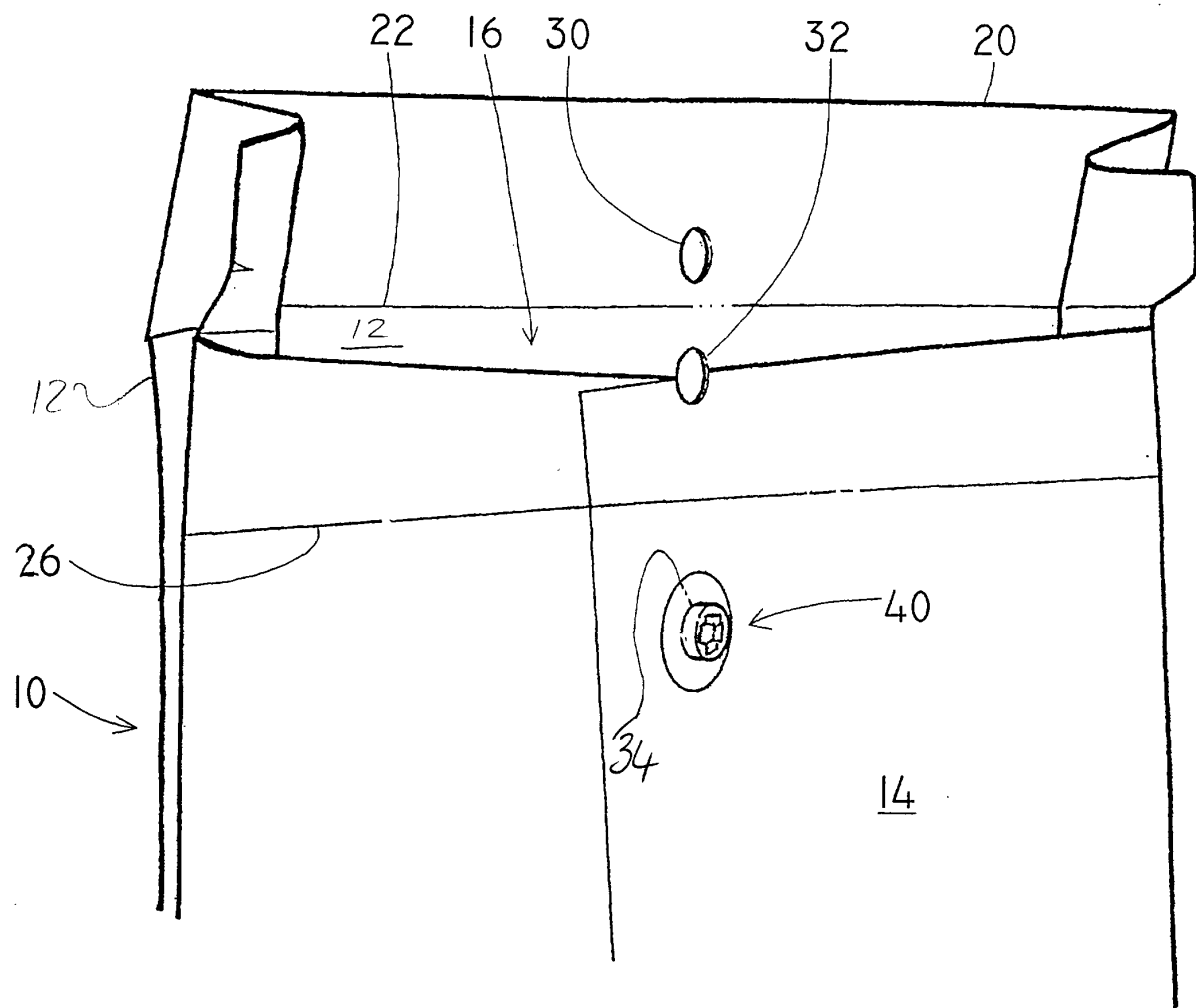


FIG 1

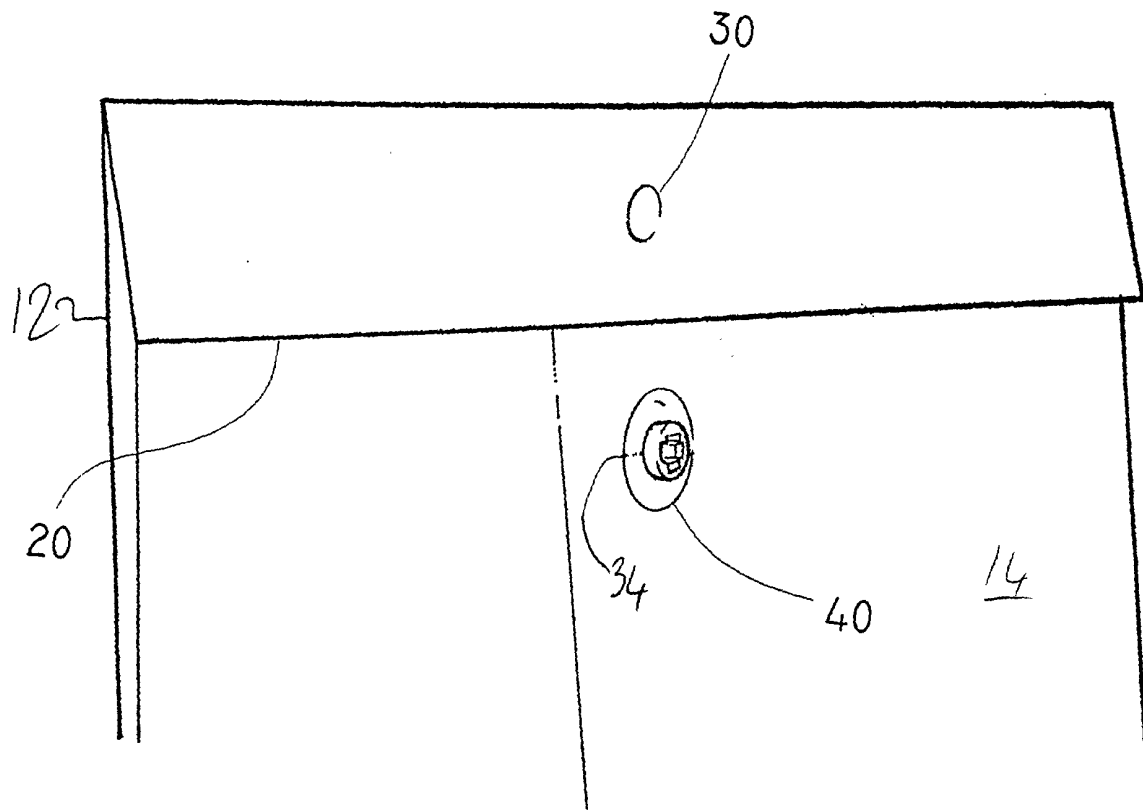


FIG 2

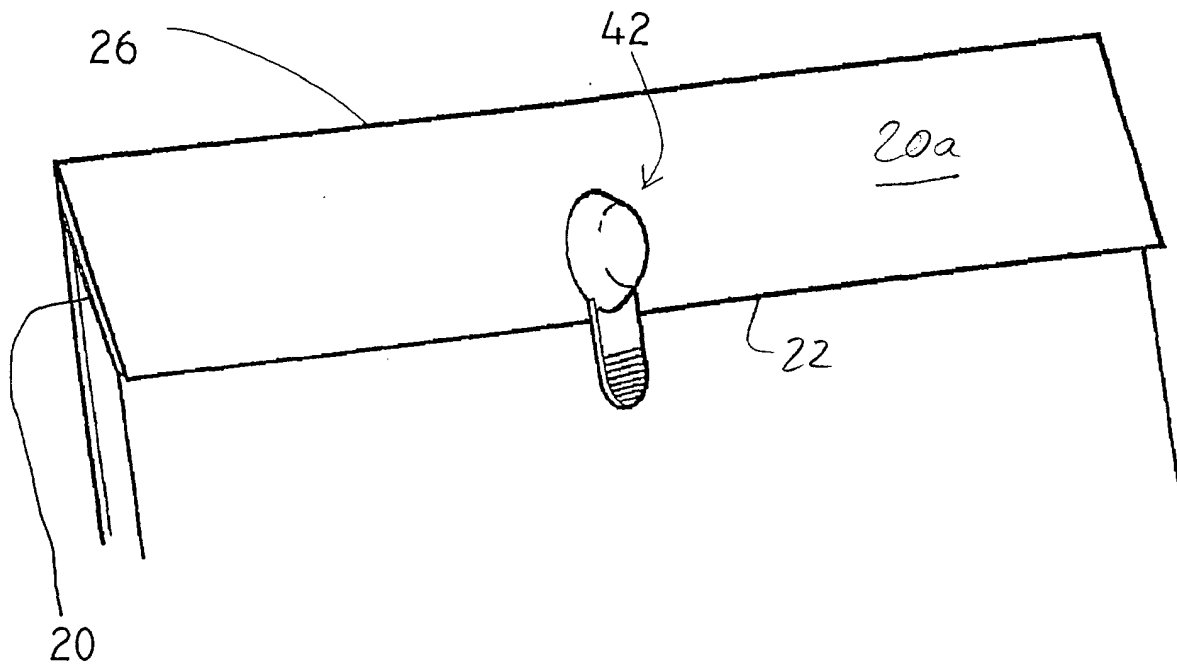


FIG 3

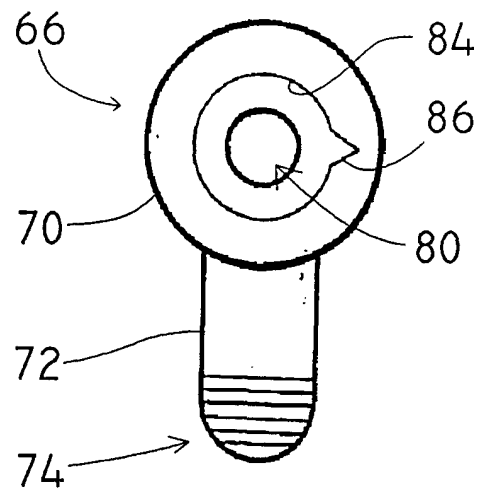
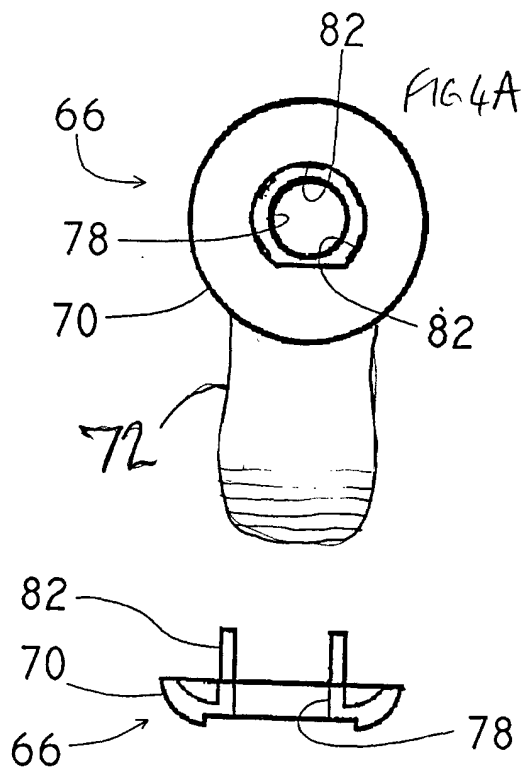


FIG 4B

FIG 4C

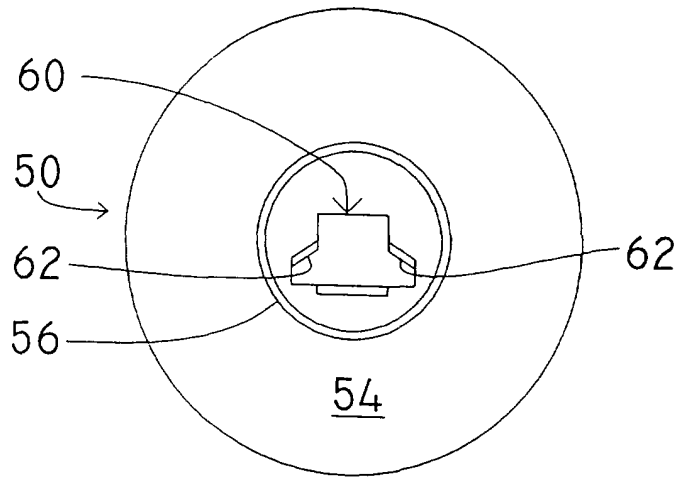


FIG 5A

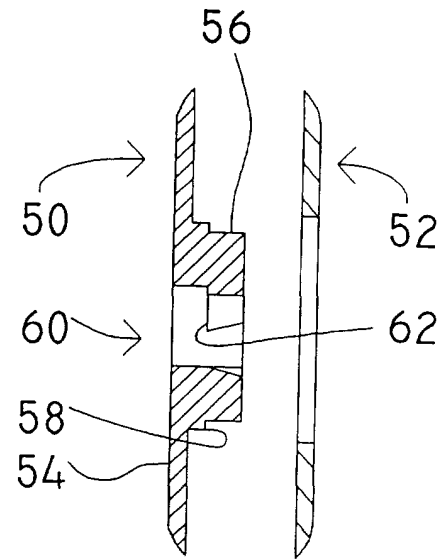


FIG 5B

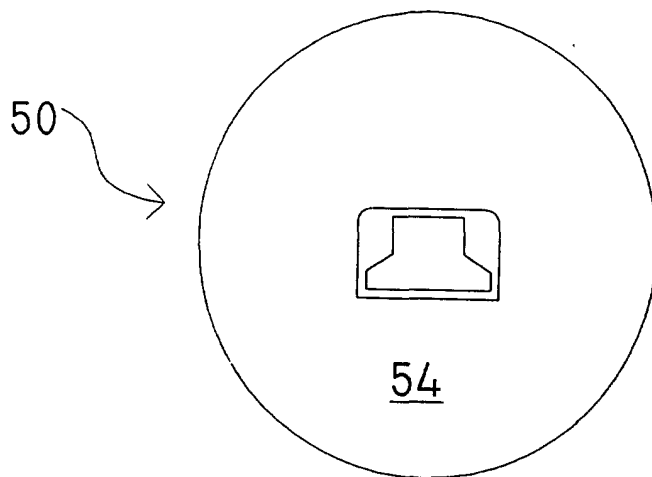


FIG 5C

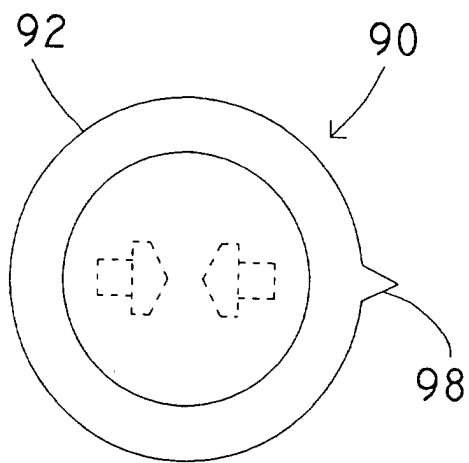


FIG 6A

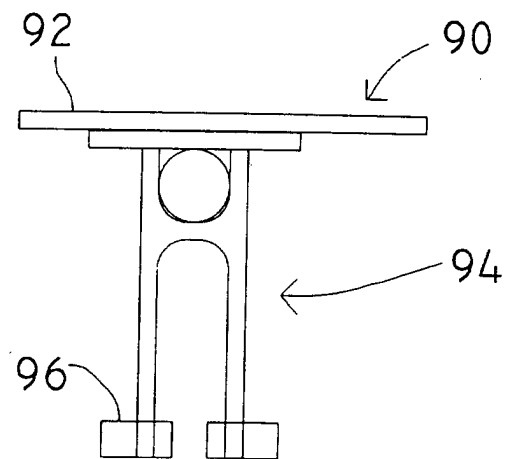


FIG 6B

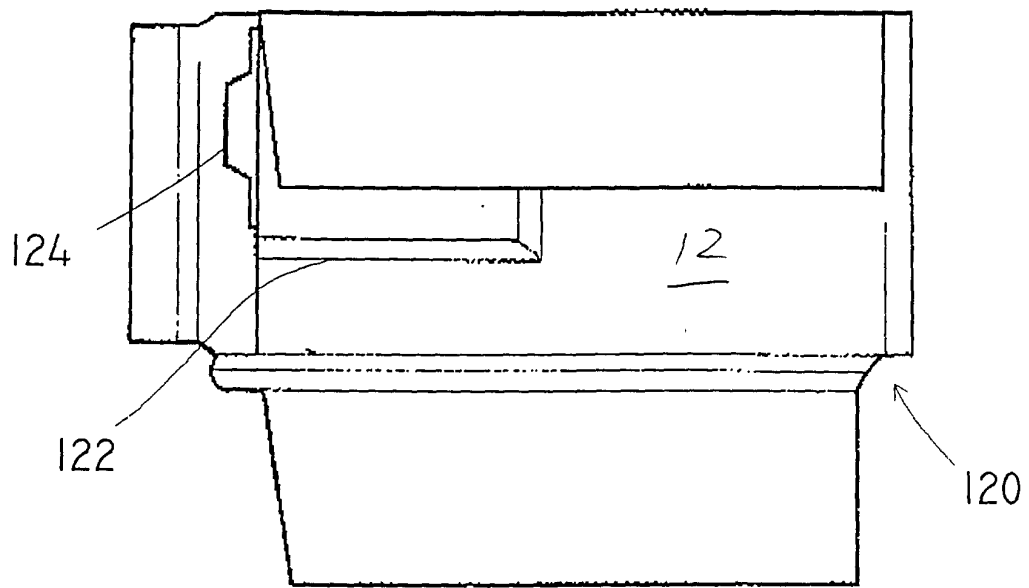


FIG 8

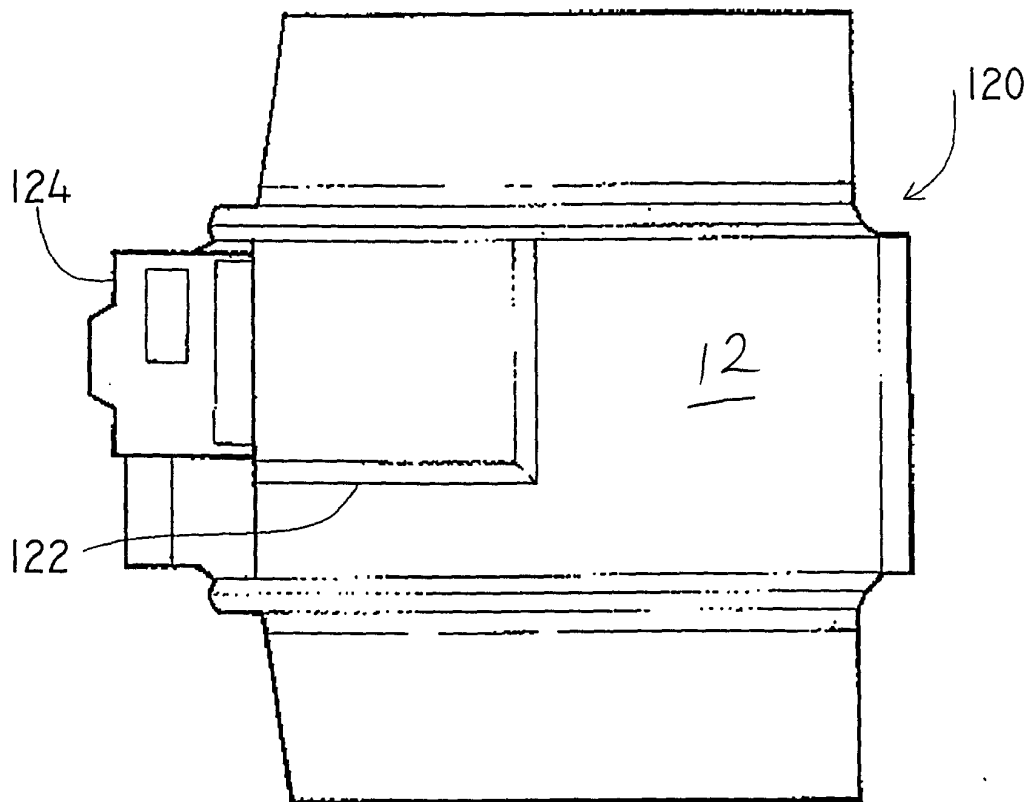


FIG 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 30 5680

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	FR 2 771 385 A (VERITE GERARD MICHEL CHRISTIAN) 28 May 1999 (1999-05-28) * page 1, line 30 - page 2, line 18; figures *	1-5	B65D27/30
A	US 3 955 842 A (EDWARDS SHIRLEY) 11 May 1976 (1976-05-11) * column 1, line 28 - line 60; figures *	1	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65D
Place of search BERLIN		Date of completion of the search 13 September 2001	Examiner Olsson, B
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