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(54) Locking device for a box

(57) A locking device for a locking a lid to a body of storage box is disclosed. The locking device a key operated turnable portion and arms extending from the arms. Each arm has an end portion that is received in a first recess in the side of the body and a hook portion that is received in a second recess in the front face of the body. When the locking device is in an unlocked position the end portions do not extend into the first recesses and the hook portions are positioned so that they can move in and out of the second recess as the lid is lifted. In the lock position the end portions extend into the first recesses and the hook portion can engage a surface of the recess preventing their removal from the recess.

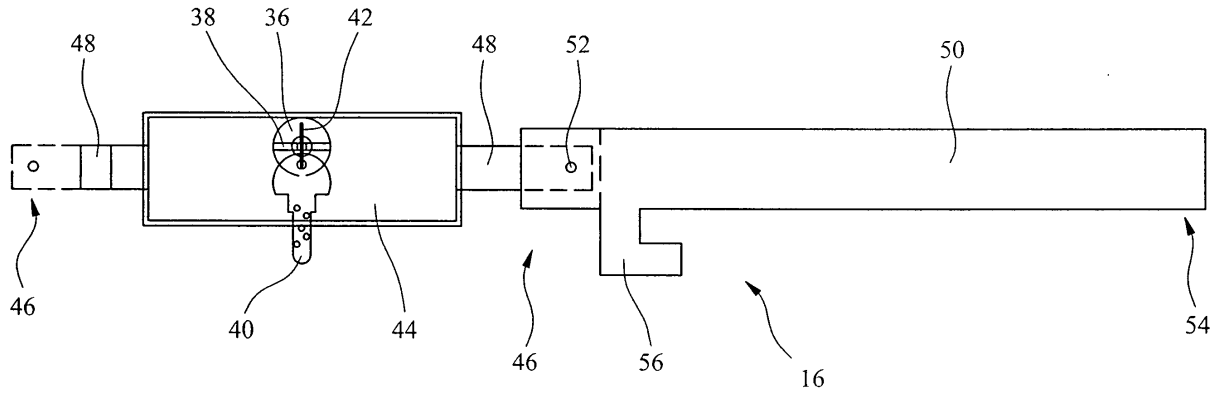

FIG. 3b

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Description

[0001] The present invention relates to a locking device for a box and relates particularly, but not exclusively, to locking devices for on-site storage boxes for tools.

[0002] With the increased usage of handheld tools on building sites it is increasingly important to ensure that such tools are securely locked away when personnel on the site are not in the immediate vicinity. Such boxes are generally made of sheet steel of around 1mm to 3mm thickness and once locked are designed to resist access to the inside of the box including attempting to force the box open using a bar, such as a jemmy bar. The weak point of many such boxes is the lid which in typical examples of the prior art is provided with a two point locking mechanism and sometimes with an anti-jemmy bar. The two locks are provided at either side of the lid and are generally locked with the same key. However, if both locks are not used, the box is vulnerable to attack on the unlocked side. Furthermore, in very wide boxes the centre of the lid can be vulnerable to attack. If a jemmy bar can be forced into the centre portion of the lid, the lid can be bent so as to pull the two locks out of engagement with the body of the box thereby overcoming the locking mechanism. Existing boxes are provided with side anti-jemmy bars which is a bar or an angle that the lid abuts against making it difficult to force anything into the junction between the body and lid of the box. However, if a jemmy bar is forced into this junction there is the possibility of bending the lid outwards thereby potentially providing access to the whole box.

[0003] It is also desirable that the box has no parts that stick out from the main surface of the box so as to decrease the likelihood of people banging their legs on protruding parts.

[0004] Preferred embodiments of the present invention seek to overcome the above described disadvantages of the prior art.

[0005] According to an aspect of the present invention, there is provided a storage box comprising:-

a) a body, at least partially defining a volume, for receiving items to be stored in said box;
b) a lid, hingedly attached to said body and adapted to close said volume; and
c) locking means for releasably locking at least one non-hinged portion of said lid into locking engagement with said body, wherein said locking means is fixedly engaged with one of said body and said lid and includes at least one turning portion and a plurality of arms extending therefrom, said arms moving between a first unlocked position and a second locked position as a result of rotation of said turning portion, wherein

i) a plurality of said arms have end portions adapted to extend into first recess portions in the other of said body and said lid when said arms are in said second position and said end portions do not extend into said first recess portions when said arms are in said first position, and
ii) at least one of said arms has a hook portion adapted to extend into a second recess portion in the other of said body and said lid such that in said second position said hook portion comes into engagement with a surface of the other of said lid and said body thereby preventing movement of said hook portion into and out of said second recess portion and that in said first position said hook portion is able to move in and out of said second recess portion.

[0006] By providing a box with a locking means that has end portions that lock a box and hook portions that also lock the box, the advantage is provided two different locking methods are used from the action of a single key thereby providing a very efficient locking mechanism, making the box very difficult to force open without use of the key. The improved locking is achieved whilst using only one key to operate the locking means. As a result, the box of the present invention is significantly more difficult to break into than those of the prior art. It is of particular note that the end portions of the arms act as deadlocks thereby providing extremely strong locks at the corners of the lid. By additionally providing the hook portions locking towards the centre of the locking mechanism, this means that in the unlikely event that an opening force is applied to the lid so as to pull the end portions out of their respective recesses, the hooks resist this pulling. The harder a pulling force is applied the more the hooks are likely to hook around the surface of the recess that they are engaged with, causing them to engage further as more force is applied. As a result, in order to force the storage box open it is not only necessary to deform the material forming the lid, it is also necessary to significantly deform the material forming the arms of a lock. Since the arms of the lock are relatively small it is economical to make them from a significantly stronger steel that it is uneconomical to form the body and lid of the box from.

[0007] In a preferred embodiment a plurality of said arms comprise respective hook portions.

[0008] The turning portion may comprise an aperture adapted to receive a key and rotation of said key by an operator results in movement of said arms between said first and second positions.

[0009] In another preferred embodiment the locking means is fixedly engaged with said lid.

[0010] The lid may comprise a first lid portion adapted to substantially form a face of said box and a second lid portion adapted to engages a first body portion wherein said first body portion and said second lid portion form an adjacent face of said box.

[0011] In a further preferred embodiment the first recess portions are formed in second and third body portions that form side faced of said box and said second

recess portions are formed in said first box portion.

[0012] According to another aspect of the present invention there is provided a storage box comprising:-

a) a body, at least partially defining a first volume, for receiving items to be stored in said box;
b) a lid, hingedly attached to said body and adapted to close said first volume;
c) locking means for releasably locking at least one non-hinged portion of said lid into locking engagement with said body; and
d) at least one handle comprising

i) a recess in a wall of said body or said lid, said recess and said wall defining a second volume;
ii) a handle portion adapted to be gripped by an operator;
iii) a plurality of support portions attached to said body or lid within said recess and adapted to receive said handle portion and allow rotation of said handle between a first storage position wherein said handle portion is contained with said second volume defined by said recess and a second position wherein at least part of said handle portion extends outside said second volume and said support portion further comprising limiting means for limiting movement of said handle portion.

[0013] By recessing the folding handle, the advantage is provided that people working near the box are less likely to bang their leg on the handle of the box. However, this has been achieved without increasing the risk of the handle damaging the hand of the person picking the box up, by limiting the extent to which the handle is able to rotate. As a result, the box is safer to lift and to work in the vicinity of.

[0014] In a preferred embodiment rotation from said first portion to said second position is rotation through 90 degrees.

[0015] According to a further aspect of the present invention there is provided a storage box comprising:-

a) a body, at least partially defining a first volume, for receiving items to be stored in said box;
b) a lid, hingedly attached to said body and adapted to close said first volume;
c) locking means for releasably locking at least one non-hinged portion of said lid into locking engagement with said body; and
d) anti-jemmy means for protecting a junction between body and said lid when said box is in a closed condition, wherein said anti-jemmy means comprises a first bar portion extending from one of said body and said lid and a second bar portion at least partially covering at least one said junction.

[0016] By providing a second bar portion partially covering the junction between the body and the lid of the storage box, the advantage is provided that the box is significantly more difficult to force open using a jemmy bar or similar device. This improvement in security has been achieved without significant increase in cost or risk of injury to people using or working near the box. Furthermore, the second bar portion has decreased the number of sharp corners on the box decreasing the likelihood of leg injury.

[0017] According to the present invention there is provided locking device comprising a locking device for locking a first article to a second article, the first article having a first end face adapted to engage a second end face of the second article and first side faces extending from said first end face and adapted to be located between second side faces of said second article, the locking device fixedly engaged with said first article and comprising:-

at least one turning portion and a plurality of arms extending therefrom, said arms moving between a first unlocked position and a second locked position as a result of rotation of said turning portion, wherein

i) a plurality of said arms have end portions adapted to extend into respective first recess portions in said second side faces when said arms are in said second position and said end portions do not extend into said first recess portions when said arms are in said first position, and
ii) at least one of said arms has a hook portion adapted to extend into a second recess portion in said second end face such that in said second position said hook portion comes into engagement with a surface of said second end face thereby preventing movement of said hook portion into and out of said second recess portion and that in said first position said hook portion is able to move in and out of said second recess portion as a result of movement of said first article relative to said second article.

[0018] In a preferred embodiment a plurality of said arms comprise respective hook portions.

[0019] The turning portion may comprise an aperture adapted to receive a key and rotation of said key by an operator results in movement of said arms between said first and second positions.

[0020] To preferred embodiments of the present invention will now be described, by way of example only, and not in any limitative sense, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a box of the present invention with the lid open;

Figure 2a is another perspective view of the box of Figure 1 from a different angle;

Figure 2b is a close up view of part of Figure 2a encircled and labelled A;

Figure 3a is a plan view of a locking device used in the box of Figure 1;

Figure 3b is a front view of the locking device of Figure 3a;

Figure 4a is a rear view of a lid of the box of Figure 1;

Figure 4b is a side view of the lid of Figure 4a;

Figure 4c is an underneath view of a lid of Figure 4a;

Figure 4d is an enlarged view of a portion of Figure 4a encircled and labelled A;

Figure 5a is a front view of the box of Figure 1, with the lid in a closed position and with the locking device shown in phantom;

Figure 5b is an enlarged portion of Figure 5a encircled and labelled A;

Figure 5c is a side view of the box of Figure 5a;

Figure 5d is an enlarged view of a portion of Figure 5c encircled and labelled B;

Figure 6a is a side view of the box of Figure 1 with the lid in a closed position;

Figure 6b is a sectional view along the lines A-A in Figure 6a;

Figure 6c is an enlarged view of a portion of Figure 6b encircled and labelled B;

Figure 6d is an enlarged view of a portion of Figure 6b encircled and labelled C;

Figure 7a shows a front view of a side portion of the body of the box shown in figure 1;

Figure 7b is an end view of the side of figure 7a;

Figure 7c is an enlarged view of a portion of figure 7b encircled and labelled A;

Figure 8 is a front view, end view, plan view and perspective view of a retaining block forming part of a handle that is part of the box of figure 1;

Figure 9 is a front view and end view of a handle used as part of the box of figure 1; and

Figures 10a, 10b and 10c show a part of an anti-jamming bar which is attached to the box of figure 1.

[0021] Referring to Figures 1 and 2, a storage box 10 has a body 12 and a lid 14. A locking means in the form of locking device 16 is provided on one of the body 12 and lid 14 in order that when the box is closed (see Figure 5a) the lid and body can be locked into engagement with each other, thereby preventing access to the body of the box. The body 12 has a base 18, side faces 20 and 22 a rear face 24 and a front face 26, the lid 14 includes an upper face 28 and front face 30 as well as side portions 32 and 34 extending from these respective faces. By virtue of the base 18 and the faces 20 to 30 of body 12 and lid 14 the box 10 defines a volume within which items, typically tools, are received.

[0022] Referring to Figures 3a and 3b, the locking means 16, which in the embodiment shown in Figures 1 and 2 attached to an inner surface of the front face 30 of lid 14, includes a turning portion 36 that is adapted to receive a key 38 (a spare key 40 is also shown) connected to the key 38 via a key ring 42. The turning portion 36 is connected to a lock body 44 from which a pair of arms 46 extends. The arms 46 are divided into first and second arm portions 48 and 50. The first arm portion 48 extends directly from lock body 44 and second arm portions 50 are connected to first arm portions 48 via a machined steel dowel 52. It should be noted in figures 3a and 3b that only one second arm portion 50 is shown. However, from the remaining figures, for example figure 4a, it is apparent that a mirror image of the second arm portion 50 shown in figures 3a and 3b is attached to the right hand first arm portion 48 shown in these figures. The second arm portion 50 has an end portion 54 and a hook portion 56.

[0023] The inner surface of side faces 20 and 22 are provided with a first recess 58 that is adapted to receive end portion 54 of arm 46. The front face 26 of body 12 has a lip 59 that extends perpendicular to the front face 26 and has second recesses 60 formed therein. The second recesses 60 are simply apertures formed in lip 59 and as a result a lower surface 62 of lip 59 is accessible through the aperture formed as part of second recess 60. This lip 62 may be strengthened using additional small pieces of steel or other material that is stronger than the steel sheet from which the body and lid are formed.

[0024] Referring to figures 7a, b and c and figures 8 and 9, a handle 64 includes a recess portion 66 having a back face 68 side faces 70 and 72 an upper face 74 and a lower face 76. The five faces 68, 70, 72, 74 and 76 together with the plane of side face 20 of body 12 form a volume of recess portion 66. A handle portion 78 is placed in said volume and retained by a pair of mounting blocks 80. Opposing end portions 82 of handle portion 78 extend into apertures 84 that extend at least partially into mounting blocks 80. Body engaging surfaces 86 and 88 of mounting block 80 are used to connect the blocks 80 to the back and upper faces 68 and 74 of recess por-

tion 66, typically by welding. Handle portions 78 is free to rotate within aperture 64 but because a cutaway portion 90 has been formed in block 80 a pair of abutment surfaces 92 and 94 limit the rotation of the handle 78 to approximately 90 degrees. As a result, under the force of gravity, when the box is resting on its base the handle portion 78 hangs vertically downwards in the position shown in figure 7a, b and c. In use, the handle is rotated into a horizontal position and the abutment surface 94 engages the handle portion 78 so as to prevent any further rotation beyond the horizontal position. As a result, it is extremely unlikely that a person picking up the box will injure their fingers by them becoming trapped between the handle and the side face 20 of the box but when not in use the handle is contained entirely within the recess thereby ensuring that a smooth outer surface of the box decreases the likelihood of leg injury.

[0025] The box is also provided with pneumatic support stays 96 to maintain the lid in an open position when required. An anti-jemmy bar 98 extends around the box at least partially covering the non-hinged junction between the body 12 and lid 14. On the side faces 20 and 22 of body 12 the anti-jemmy bar 98 is located on the body whereas for the front faces 26 and 30 it is located on the front face 30 of lid 14.

[0026] Referring to figures 10a, 10b and 10c, a portion 100 of anti-jemmy bar 98 has a weldable face 102 and a weldable edge 104 for connecting the portion 100 to the side face 20 of box 10. The portion 100 of bar 98 has extension portions 106 and 108 that cover the edge of the lid when it is in a closed position. These extension portions are joined to the weldable face 102 and weldable edge 104 by connection portions 110 and 112. Angled edge 114 allows portion 100 to be connected to another portion 116 of bar 98 that extends horizontally adjacent the top edge of the side face 20.

[0027] When lid 14 is moved into a closed position edges 118 and 120 of side portion 34 are located between the side face 20 and extension portions 106 and 108 respectively. As a result, it is virtually impossible to get any perches on the edges 118 and 120 of lid 14 in order to attempt to bend it or force it open. Furthermore, the extension portions 106 and 108 prevent the side portion 34 from being bent away from its position adjacent the side face 20 of body 12. The portion 116 of anti-jemmy bar 98 similarly protects the side portion 32 of lid 14.

[0028] With reference to figure 6c, a cross-section through the portion 116 of bar 98 is shown. In this figure the parts equivalent to weldable face 102, extension portion 106 and connection portion 110 have been labelled 102a, 106a and 110a respectively.

[0029] In use, when the lid 14 of box 10 is moved from the open position, shown in figure 1 to a closed position a support stay 96 is compressed. When the lid 14 is in the closed position the hook portions 56 of arm 46 extend into second recesses 60. However, the end portions 54 of arm 46 do not extend into first recesses 58. When key 38 is rotated in turning portion 36 the first arm portions 48 extend out of lock body 44 in opposite directions. As a result, end portions 54 of second arm portions 50 extend into first recesses 58, in a manner recognisable to the person skilled in the art as that of a deadlock. As a result, the lid is retained in locking engagement with the body 12.

[0030] At the same time the hook portions 56 are caused to move in opposing directions and as a result the hook ends 57 extend partially under lip 59 and beyond the aperture that forms the opening in recess 60. As a result, if lid 14 is moved in a direction in an attempt to open the box, the hook ends 57 come into engagement with lower surface 62 of lip 59 and are prevented from movement. If a person attempting to gain entry to the box 10 uses a bar to force the lid open the force applied towards the centre of the lid pulls the hook ends 57 into engagement with surface 62, making it almost impossible to force the lid open. In order for the lid to be forced open it is generally necessary to break or significantly deform the hook portions 56. Furthermore, as can be seen in figure 5a, the two hook portions 56 are spaced apart so as to provide even distribution of the end portions and hook portions along the length of the lid 14.

[0031] It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only, and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims. For example, this locking mechanism described above could be used in other situations where two elongate edges are brought together and locked. An example of such a situation might be where a first article is locked to a second article, where the first article is slidingly received in a second article such as a cupboard with a sliding door. The first article, the door, has a first end face adapted to engage a second end face of the second article, the cupboard. The door also has top and bottom first side faces extending from the first end face and these are slidingly located between second side faces of cupboard. The locking device is fixed to the door. As seen on the device used on the box, there is a turning portion that receives a key and two arms extending therefrom. The arms move between an unlocked position and a locked position as a result of rotation of said turning portion. The arms have end portions adapted to extend into respective first recess portions in the second side faces of the cupboard when the arms are in the locked position and the end portions do not extend into the first recess portions when the arms are in the unlocked position. At least one, or preferably both, of the arms have hook portions that extend into respective second recess portions in the second end face of the cupboard such that in locked position the hook portions comes into engagement with an inner surface of the second end face thereby preventing movement of the hook portion into and out of the second recess portion and that in the unlocked position the hook portion is able to move in and out of the second recess portion as a result of

movement of the door relative to the cupboard. The benefits of using this locking device on such a cupboard are similar to those set out above for the box.

Claims

1. A storage box comprising:-

a) a body, at least partially defining a volume, for receiving items to be stored in said box;
b) a lid, hingedly attached to said body and adapted to close said volume; and
c) locking means for releasably locking at least one non-hinged portion of said lid into locking engagement with said body, wherein said locking means is fixedly engaged with one of said body and said lid and includes at least one turning portion and a plurality of arms extending therefrom, said arms moving between a first unlocked position and a second locked position as a result of rotation of said turning portion, wherein

i) a plurality of said arms have end portions adapted to extend into first recess portions in the other of said body and said lid when said arms are in said second position and said end portions do not extend into said first recess portions when said arms are in said first position, and
ii) at least one of said arms has a hook portion adapted to extend into a second recess portion in the other of said body and said lid such that in said second position said hook portion comes into engagement with a surface of the other of said lid and said body thereby preventing movement of said hook portion into and out of said second recess portion and that in said first position said hook portion is able to move in and out of said second recess portion.

2. A box according to claim 1 wherein a plurality of said arms comprise respective hook portions.

3. A box according to claims 1 or 2 wherein said turning portion comprises an aperture adapted to receive a key and rotation of said key by an operator results in movement of said arms between said first and second positions.

4. A box according to any one of the preceding claims, wherein said locking means is fixedly engaged with said lid.

5. A box according to any one of the preceding claims, wherein said lid comprises a first lid portion adapted to substantially form a face of said box and a second lid portion adapted to engages a first body portion wherein said first body portion and said second lid portion form an adjacent face of said box.

6. A box according to claims 4 or 5 wherein said first recess portions are formed in second and third body portions that form side faces of said box and said second recess portions are formed in said first box portion.

7. A storage box comprising:-

a) a body, at least partially defining a first volume, for receiving items to be stored in said box;
b) a lid, hingedly attached to said body and adapted to close said first volume;
c) locking means for releasably locking at least one non-hinged portion of said lid into locking engagement with said body; and
d) at least one handle comprising

i) a recess in a wall of said body or said lid, said recess and said wall defining a second volume;
ii) a handle portion adapted to be gripped by an operator;
iii) a plurality of support portions attached to said body or lid within said recess and adapted to receive said handle portion and allow rotation of said handle between a first storage position wherein said handle portion is contained with said second volume defined by said recess and a second position wherein at least part of said handle portion extends outside said second volume and said support portion further comprising limiting means for limiting movement of said handle portion.

8. A box according to claim 8, wherein rotation from said first portion to said second position is rotation through 90 degrees.

9. A storage box comprising:-

a) a body, at least partially defining a first volume, for receiving items to be stored in said box;
b) a lid, hingedly attached to said body and adapted to close said first volume;
c) locking means for releasably locking at least one non-hinged portion of said lid into locking engagement with said body; and
d) anti-jemmy means for protecting a junction between body and said lid when said box is in a closed condition, wherein said anti-jemmy means comprises a first bar portion extending from one of said body and said lid and a second

bar portion at least partially covering at least one said junction.

10. A locking device for locking a first article to a second article, the first article having a first end face adapted to engage a second end face of the second article and first side faces extending from said first end face and adapted to be located between second side faces of said second article, the locking device fixedly engaged with said first article and comprising:-

at least one turning portion and a plurality of arms extending therefrom, said arms moving between a first unlocked position and a second locked position as a result of rotation of said turning portion, wherein

i) a plurality of said arms have end portions adapted to extend into respective first recess portions in said second side faces when said arms are in said second position and said end portions do not extend into said first recess portions when said arms are in said first position, and
ii) at least one of said arms has a hook portion adapted to extend into a second recess portion in said second end face such that in said second position said hook portion comes into engagement with a surface of said second end face thereby preventing movement of said hook portion into and out of said second recess portion and that in said first position said hook portion is able to move in and out of said second recess portion as a result of movement of said first article relative to said second article.

11. A locking device according to claim 11 wherein a plurality of said arms comprise respective hook portions.

12. A locking device according to claims 11 or 12 wherein said turning portion comprises an aperture adapted to receive a key and rotation of said key by an operator results in movement of said arms between said first and second positions.

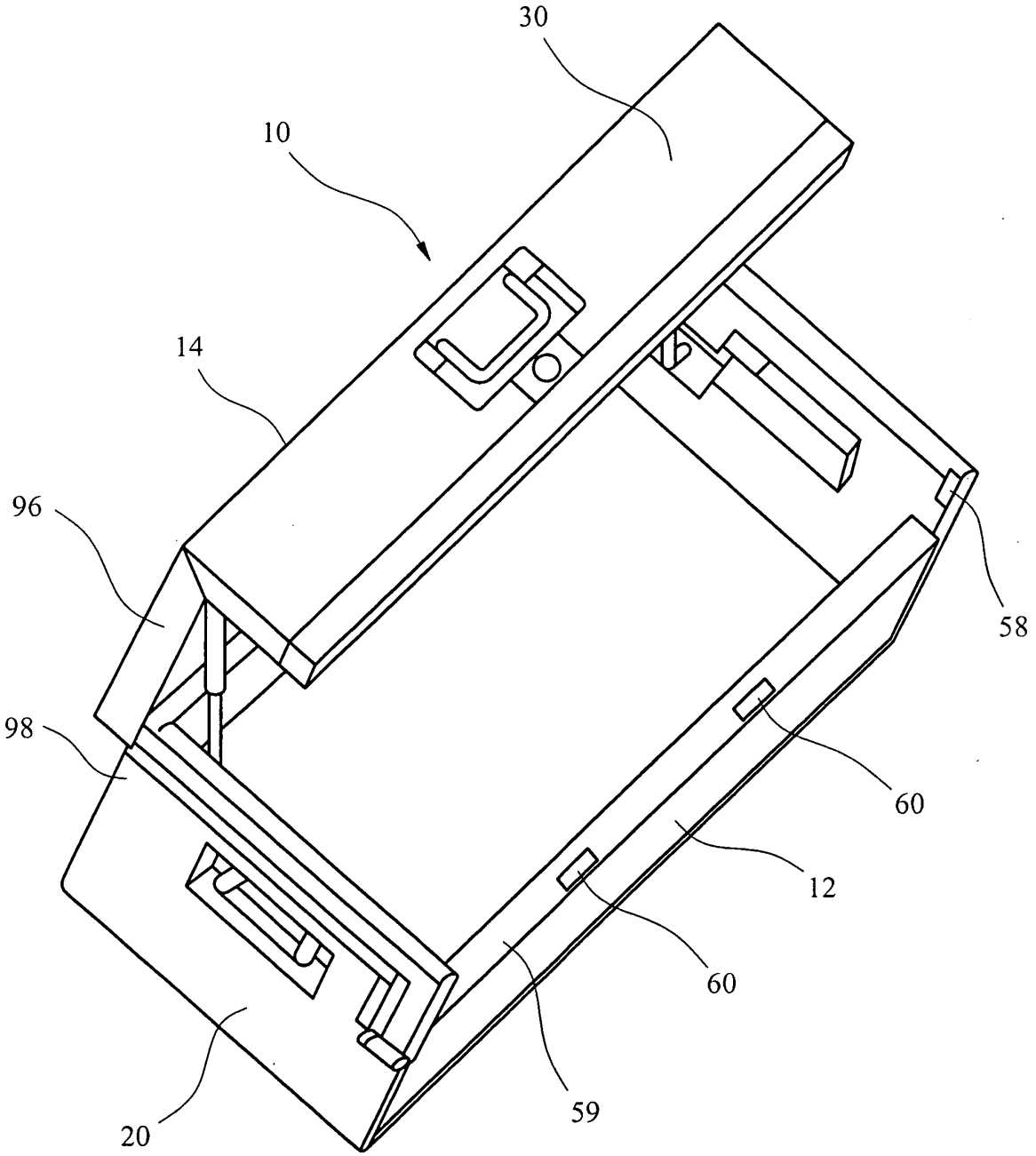
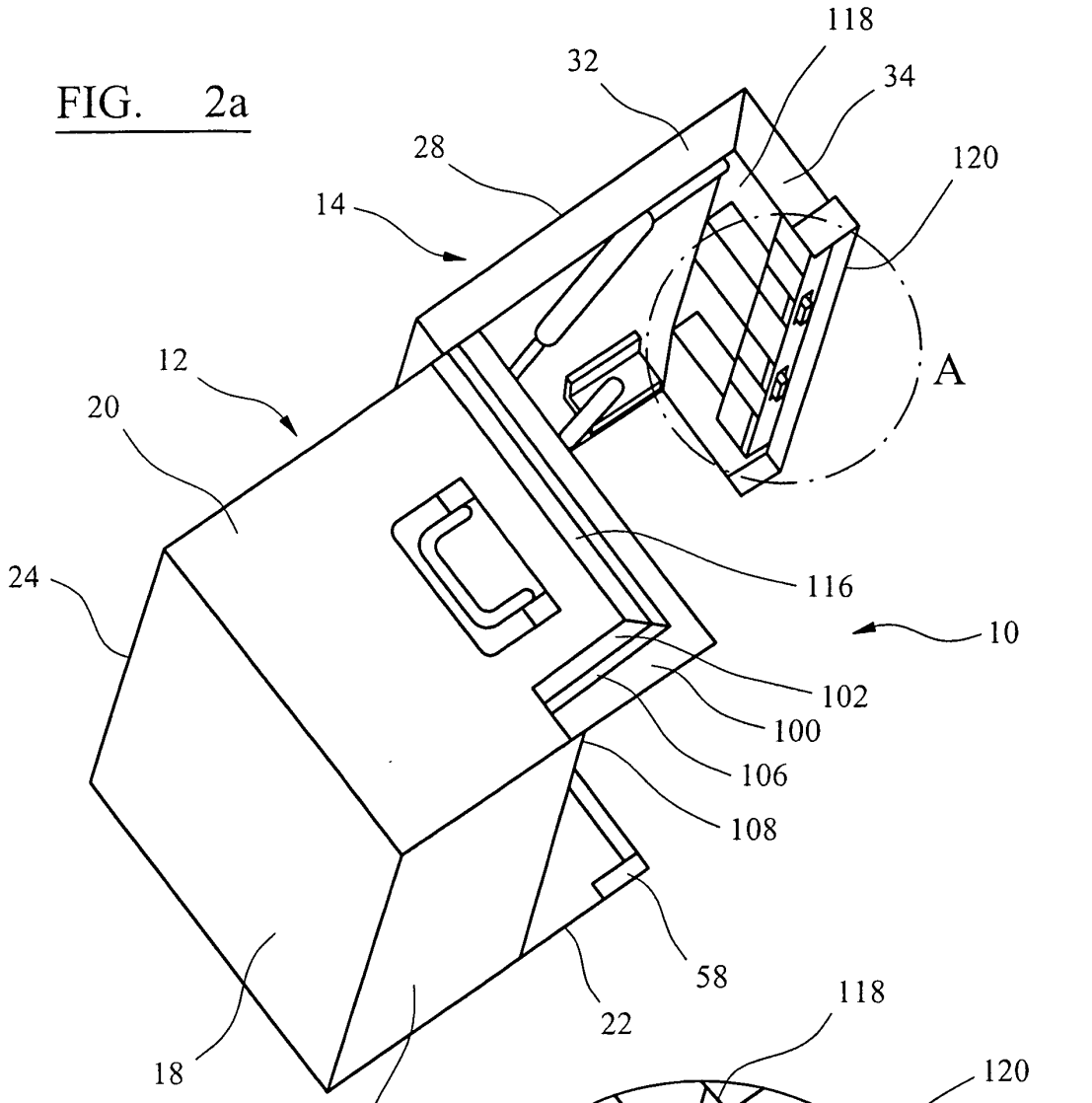


FIG. 1

FIG. 2a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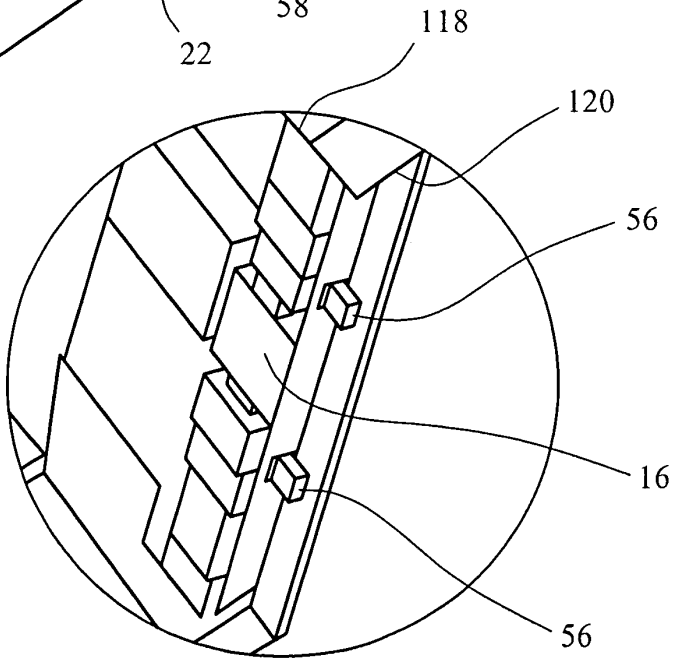
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FIG. 2b

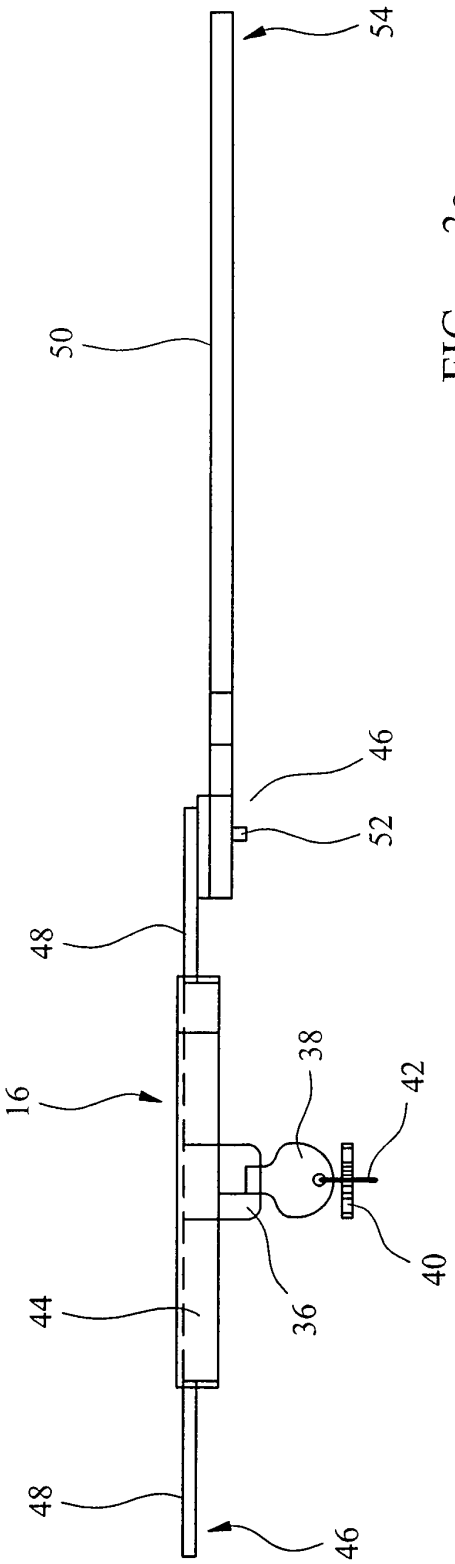
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FIG. 3a

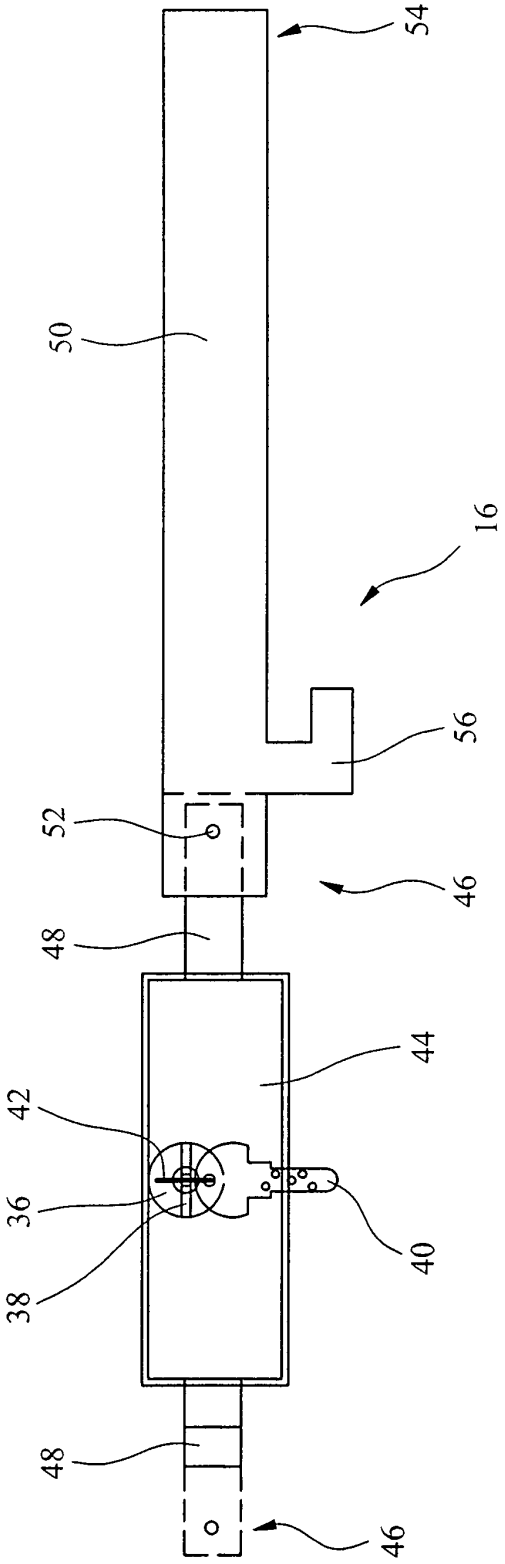
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FIG. 3b

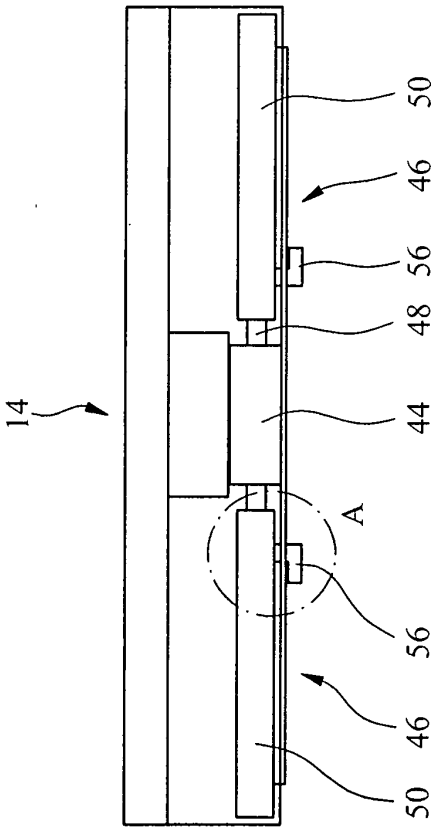


FIG. 4a

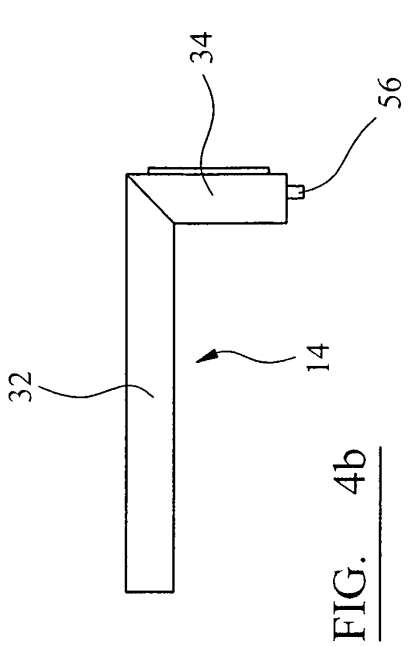


FIG. 4b

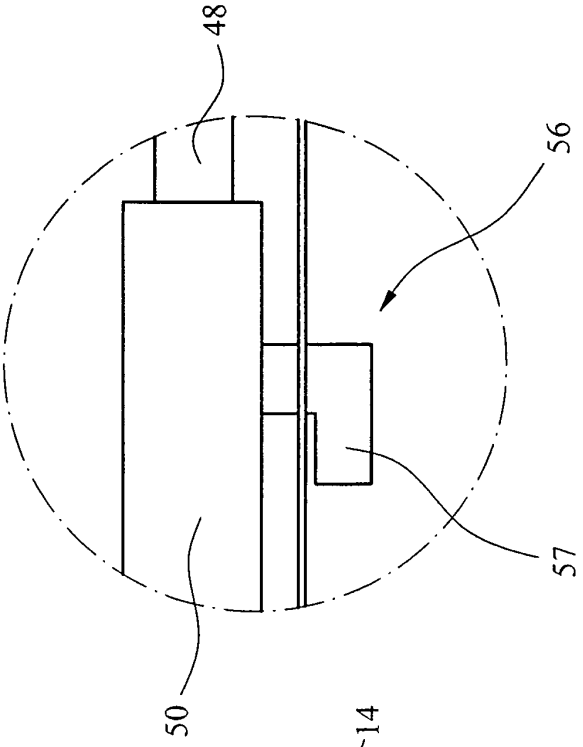


FIG. 4d

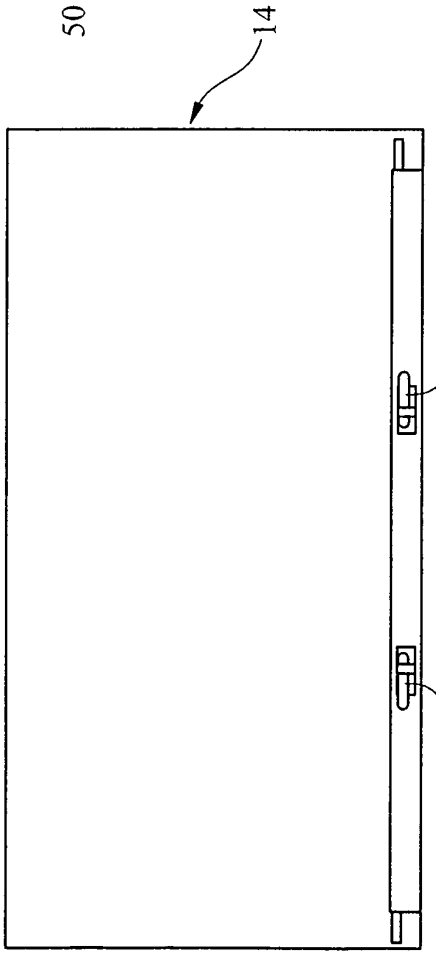


FIG. 4c

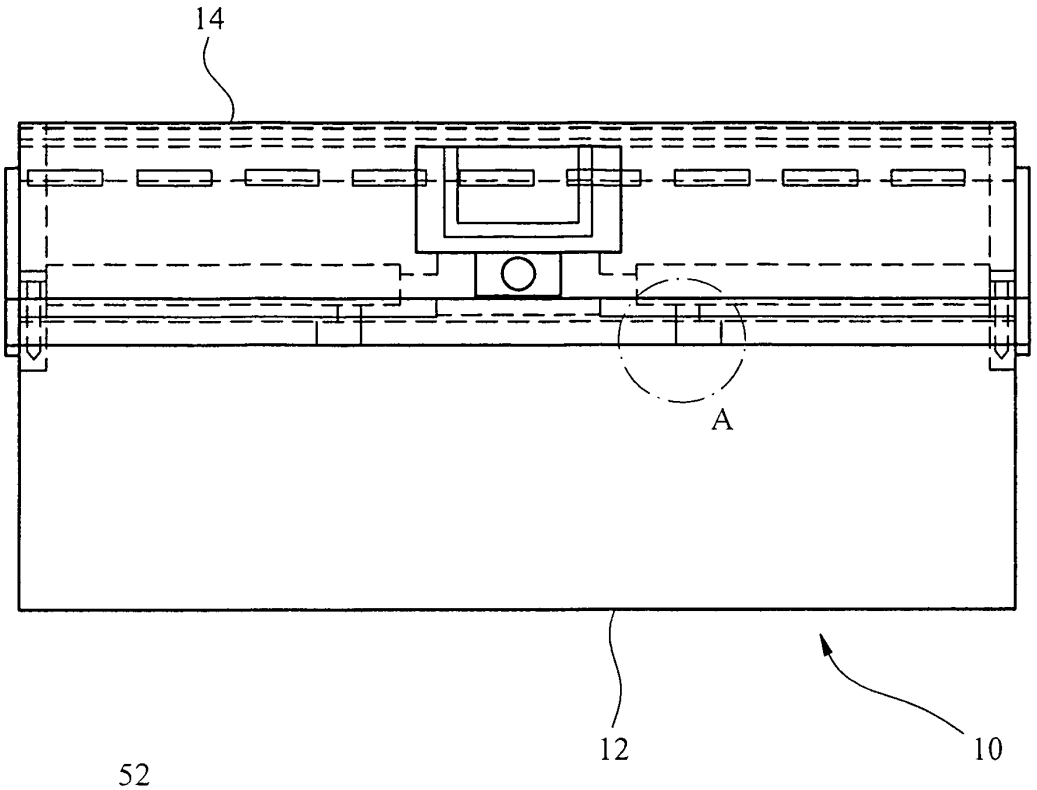


FIG. 5a

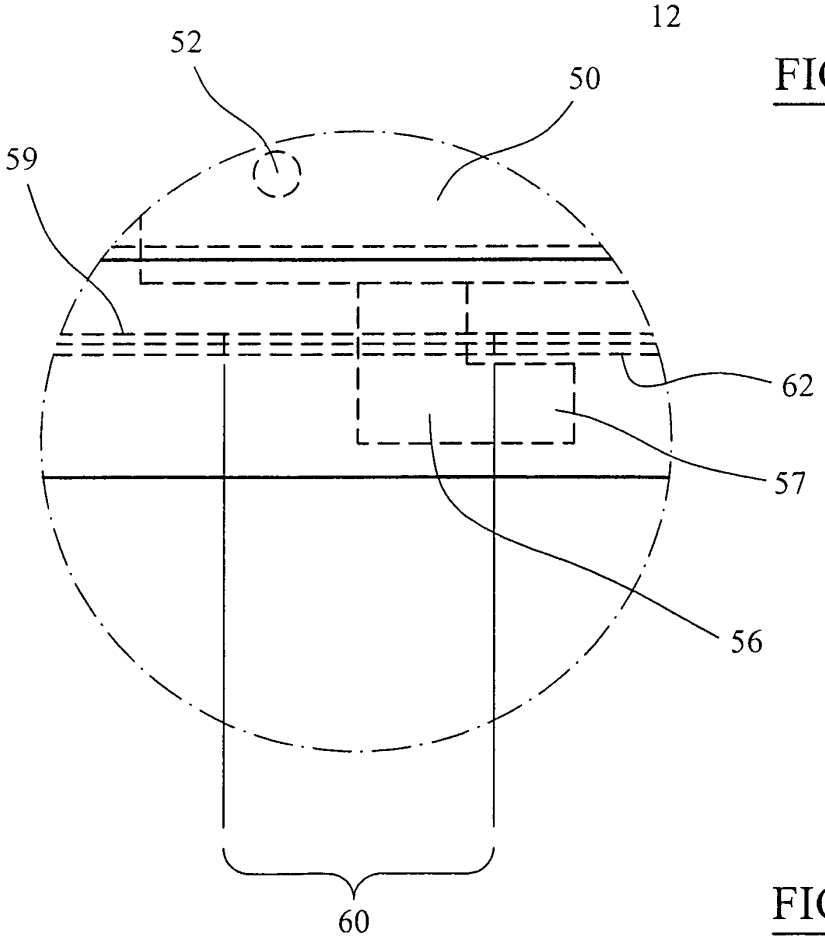


FIG. 5b

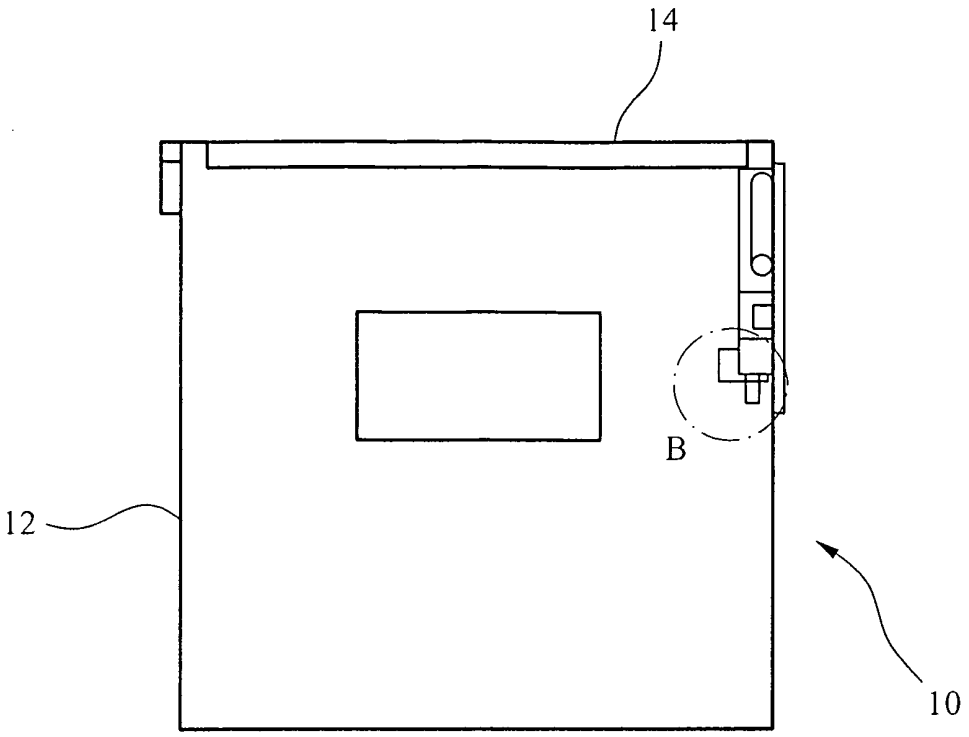


FIG. 5c

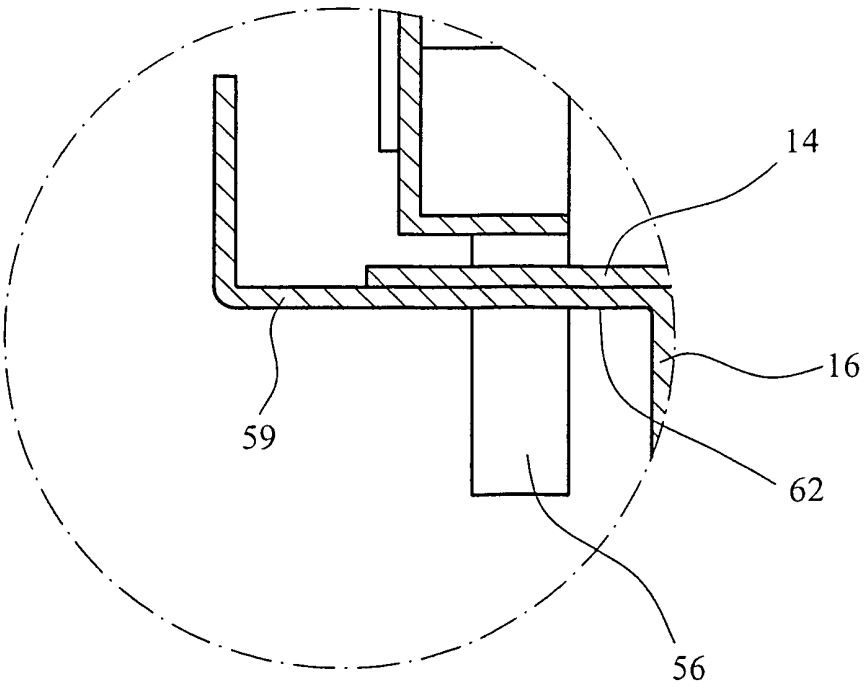


FIG. 5d

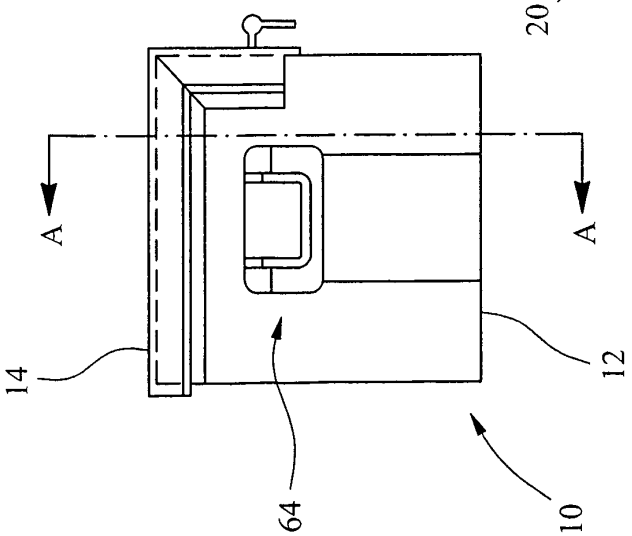


FIG. 6a

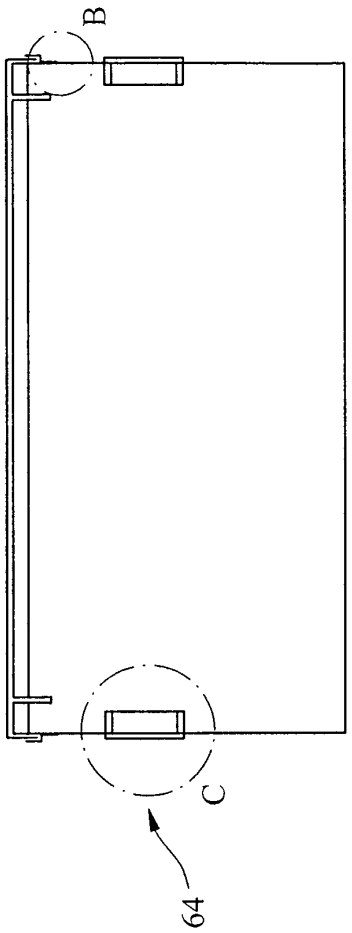


FIG. 6b

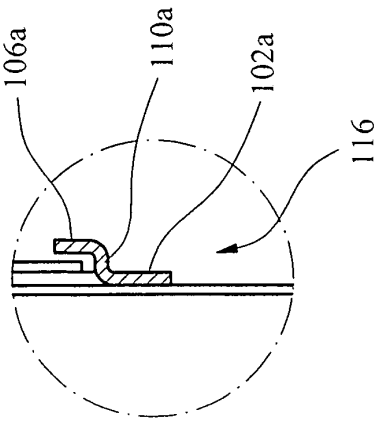


FIG. 6c

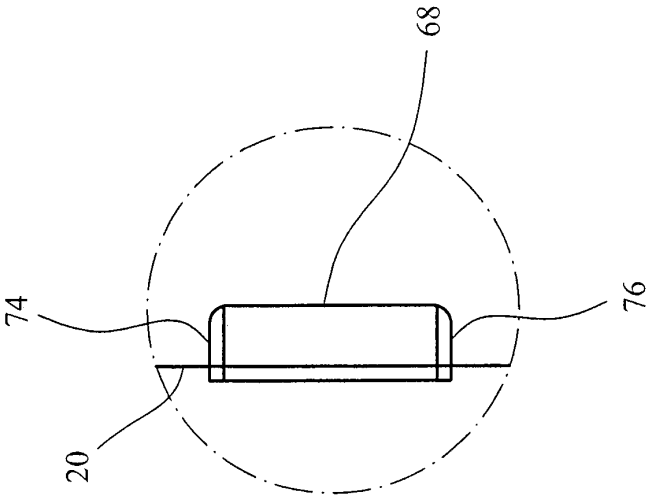


FIG. 6d

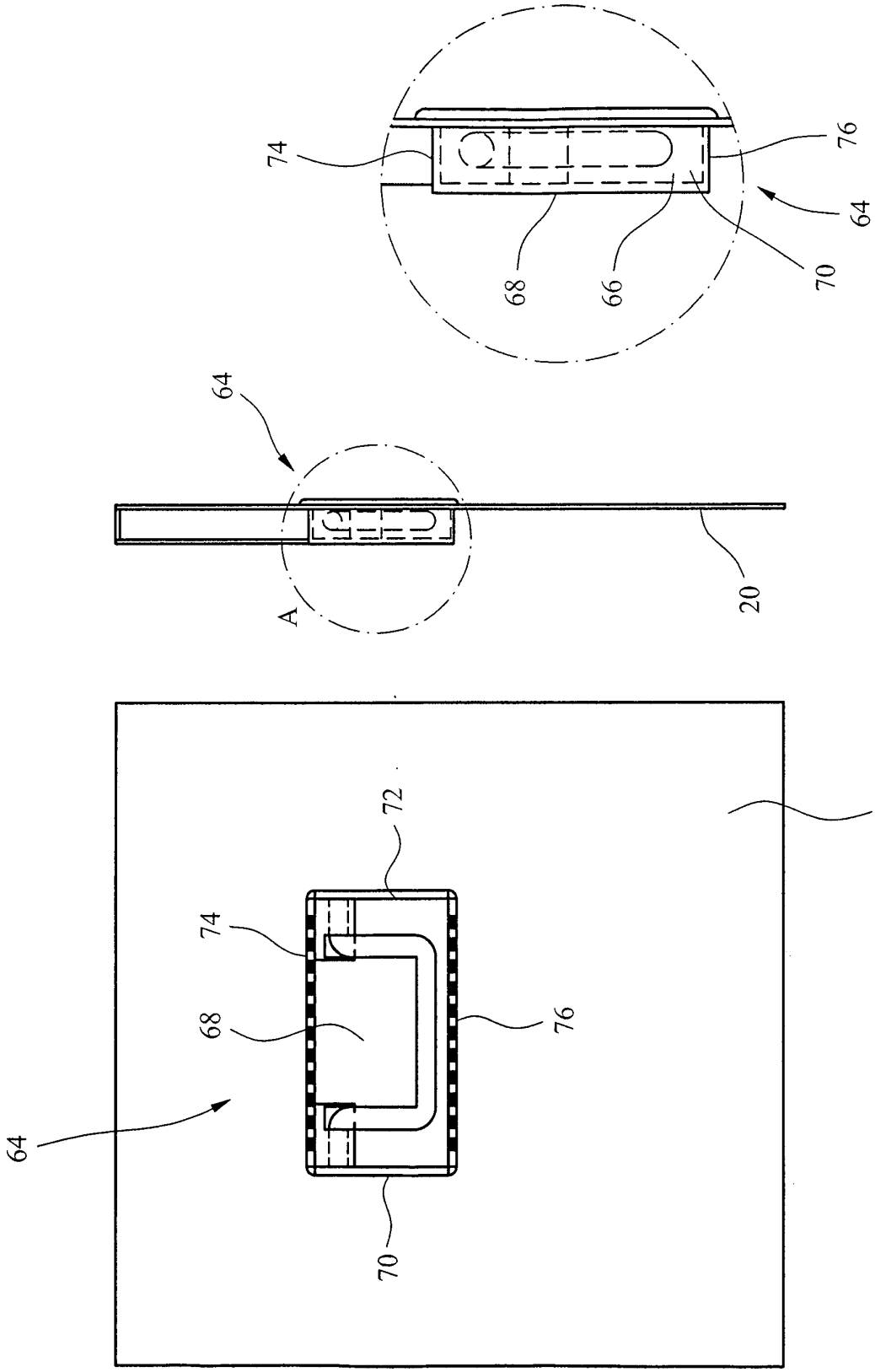


FIG. 7c

FIG. 7b

FIG. 7a

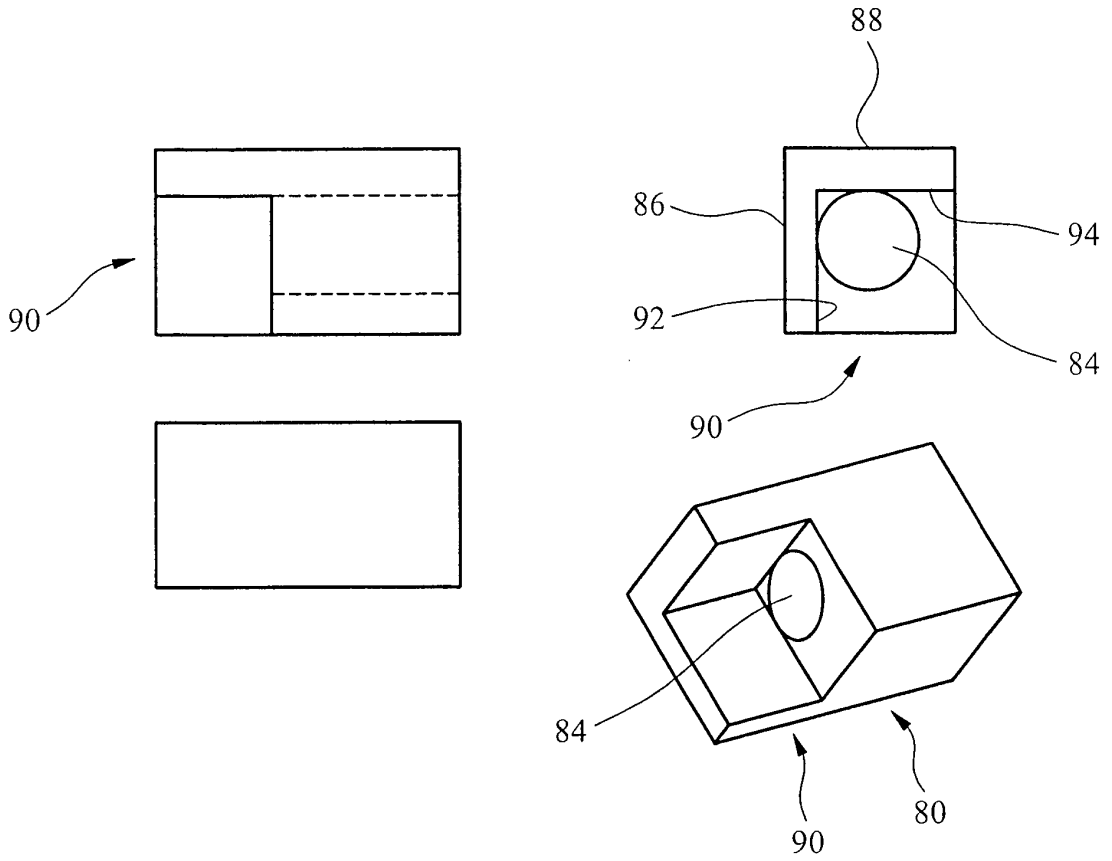


FIG. 8

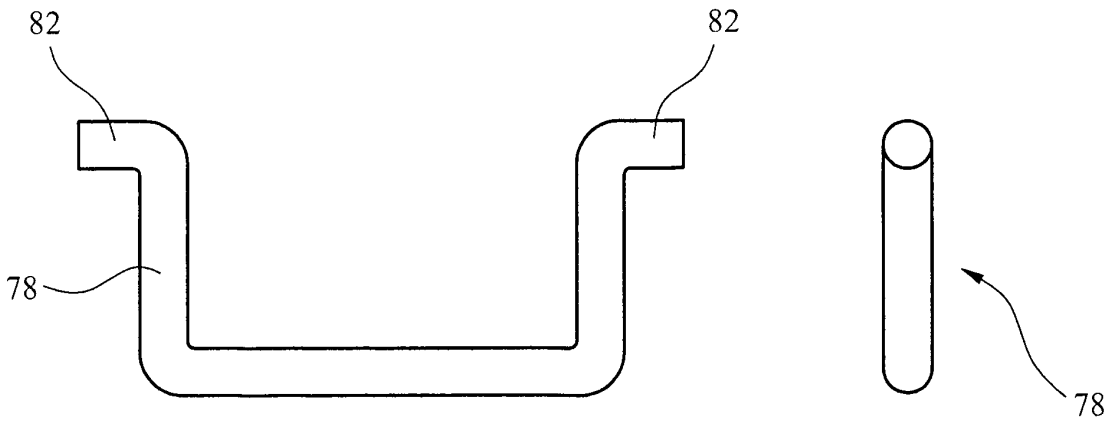


FIG. 9

FIG. 10a

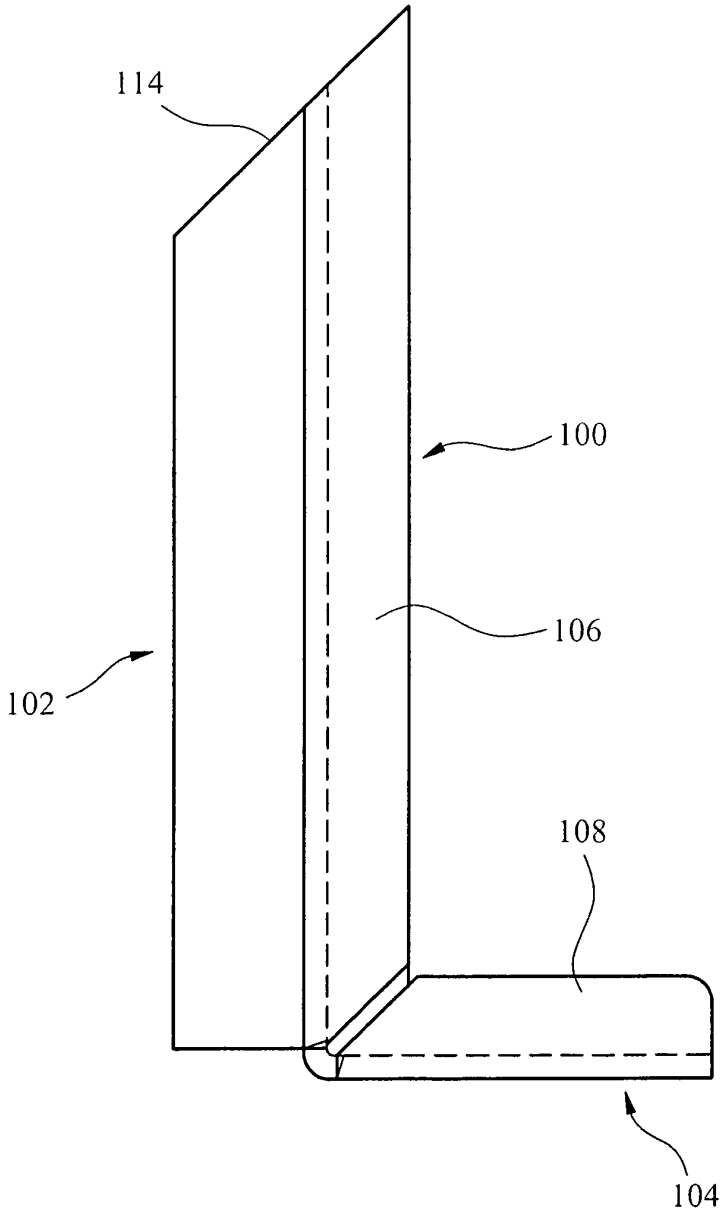
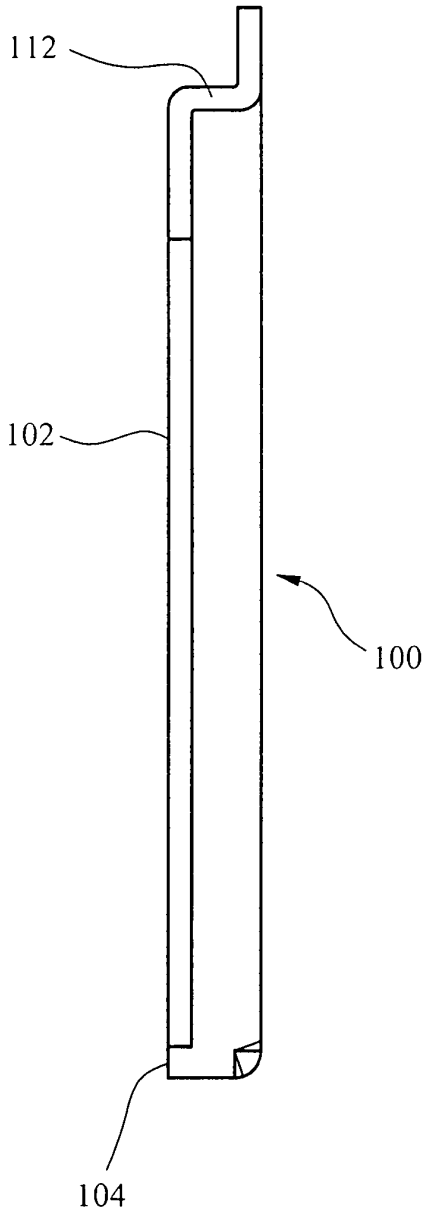


FIG. 10b



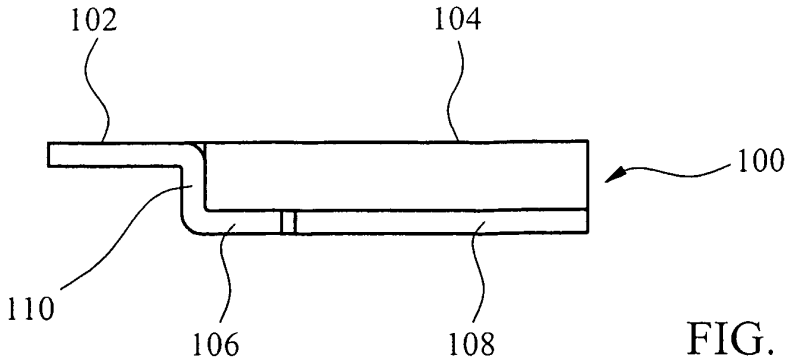


FIG. 10c