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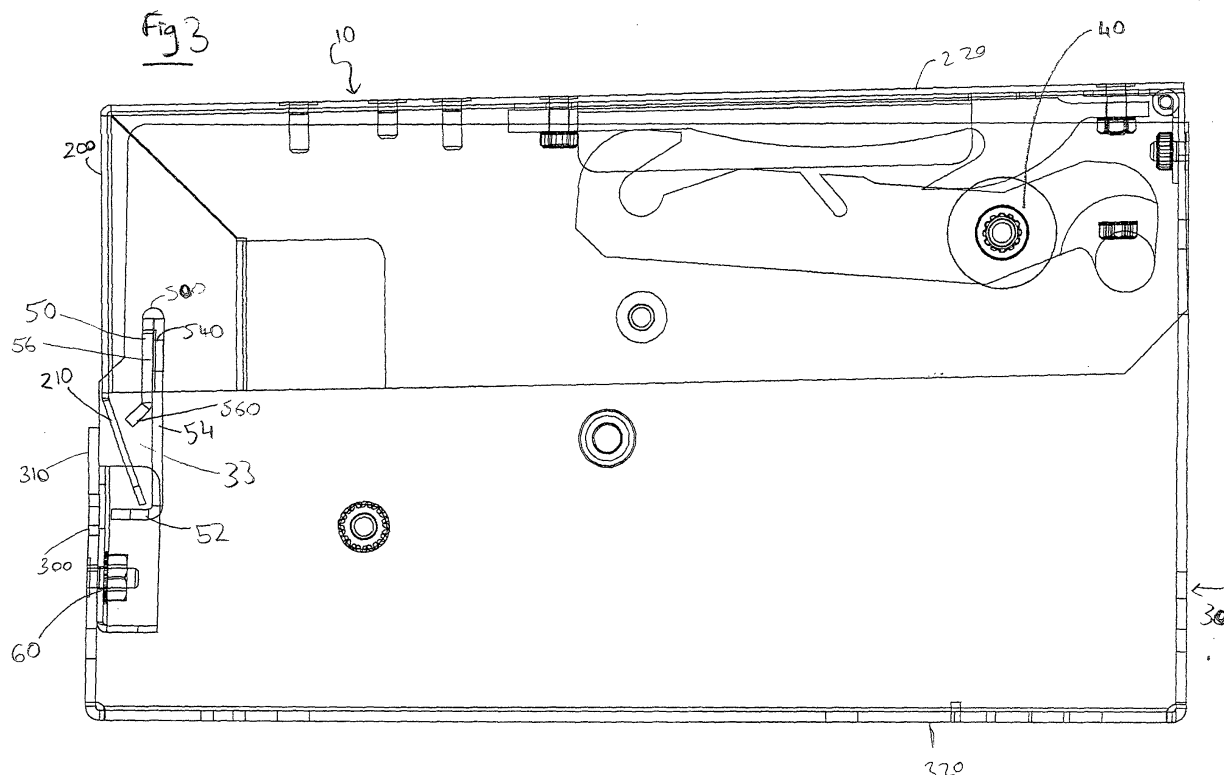
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(54) **Cash storage unit**

(57) The invention relates to a highly secure cash storage unit 10 for containing coins, bank notes, card transaction slips, coupons etc. and to a cash register or a retail checkout system comprising such a cash storage unit. The cash storage unit 10 comprises a base, a

lid 20 and a locking means for locking the lid in a closed position and may further comprise a drawer for storing cash. The lid 20 and/or the base are deformable such that, when force is used to try to move the lid 20 from the closed position to the open position the lid 20 and base engage to retain the lid in the closed position.



Description

[0001] The present invention relates to a cash storage unit for containing coins, bank notes, card transaction slips, coupons, etc. and to a retail check-out system comprising a cash storage unit. The cash storage unit may be a stand-alone unit, or may form a module or a component part of a cash register or check-out system.

[0002] Conventional cash registers are known which generally comprise a housing with a keypad and a display, and a cash drawer unit underneath. The cash drawer generally comprises a tray slidably mounted inside the register. When access to the cash drawer is required, the tray is propelled open towards the operator.

[0003] More recently, retail check-out systems have been developed, for example for supermarkets, which are modular in construction and comprise some or all of the following modules: input conveyor, output conveyor, barcode scanner, display(s), weighing scales, card swipe unit, printer and cash storage unit. The check-out will also normally include some form of computer interface, which may be a keyboard or possibly a computer terminal. The card swipe unit may be integral with the computer interface, e.g. as part of the keyboard.

[0004] The cash storage unit in such a modular system usually comprises a base for containing the contents of the unit together with a lid which may be opened manually or on receipt of a command e.g. from the keyboard or check-out microprocessor.

[0005] The cash storage unit is also provided with locking means to lock the drawer in the closed position, which may be an electronic lock, a remotely-operable lock, or a key-operated lock. The unit is locked in order to provide increased security when the check-out is unattended, or in between transactions. Locking may also be desirable when transferring the cash drawer unit from one operator to another or from one checkout to another.

[0006] However, despite known locking techniques, unauthorised entry and theft of the contents of the cash storage unit may still be possible, such as by forcibly gaining entry to the inside. For example, instances have occurred in which a lever such as a screwdriver has been inserted between the lid and the base and the two components forced apart, breaking the lock and gaining access to the contents of the unit.

[0007] In accordance with a first aspect, the present invention provides a cash storage unit comprising a base for containing the contents of the unit, a lid for covering the contents when in a closed position, and locking means for locking the lid in the closed position, wherein the lid and/or base are deformable such that, when force is used to try to separate the lid and base when locked together, the lid and base engage to retain the lid in the closed position.

[0008] The lid is preferably mounted to the base by means of a hinge.

[0009] The engagement between the lid and base serves to interlock the lid and base, such that the lid is

more strongly held in the closed position. The engagement can be considered to be a positive engagement. The lid and base cooperate to form a secondary locking engagement, in addition to the primary locking engagement of the locking means.

[0010] The lid and/or base may be elastically or plastically deformable to achieve the described engagement, i.e. the lid and/or base may deform temporarily or permanently.

[0011] The cash storage unit is preferably provided with engaging means, either on the lid or on the base, or on both. The engaging means may comprise any suitable structure which causes the interlocking or positive engagement, such as a projection, flange, recess, plate, lip, hem, fold or the like. If the lid is hinged to the base, the engaging means may be provided on the lip of the lid (i.e. the edge which is distal from the hinge and which meets the base in the closed position) and/or on the sides of the lid. The engaging means may alternatively or in addition be provided on the corresponding portions of the base.

[0012] In preferred embodiments, the lid is deformable so as to engage with the base when forced. Preferably, the lip of the lid, or a region adjacent the lip of the lid, is so deformable. The lid may be provided with engaging means, which in preferred embodiments is a flange or hem, preferably folded inside the lid.

[0013] In preferred embodiments, the base is configured to be relatively rigid or undeformable, at least in comparison to the lid, so that the lid deforms in preference to the base. Preferably, the base is provided with engaging means with which the lid engages when deformed. The base engaging means in preferred embodiments may comprise a recess, flange, projection or hem with which the lid or the lid engaging means engages under force to provide the described secondary locking cooperation.

[0014] Means may also be provided on the base which is designed to strengthen the base, such as a plate which is provided on the outside of the base.

[0015] The present invention, at least in its preferred embodiments, thus provides a cash storage unit which is more secure than known cash storage units which have a simple lock. When a lever, such as a screwdriver for example, is inserted between the lid and the base to try to force the lock, the lid and/or base deforms at least in the area of the applied force to provide a point or area of secondary engagement to supplement the lock. Thus, the applied force actually increases the engagement between the lid and base. In this way, a more secure cash storage unit is provided.

[0016] Preferably, the engagement is provided automatically as the lid or base is forced in a particular direction. Therefore, the base engagement means are most appropriately placed behind the lip of the lid, effectively inside the cash storage unit, so that the most likely direction of force (inwards and upwards on the lid) will cause automatic secondary engagement.

[0017] As mentioned above, additional engagement means on the base may include means to strengthen the base so that the base deforms in preference to the lid. This may comprise a strengthening plate on the front of the base, or may simply require the front of the base to be made of relatively strong material. Thus, when a lever acts on the base, the base is more likely to resist deformation.

[0018] In accordance with another aspect, the present invention provides a cash storage unit comprising a housing and a drawer for storing cash, the housing comprising a lid and a base the lid being mounted to the base via hinge means or the like and locking means for locking the lid in a closed position, the arrangement of the storage unit being such that when force is applied to the lid in a closed position, the lid positively engages with the base. Preferably, the means are provided on the lid or on the base or on both such that when force is applied to the lid when the lid is in a closed position the lid positively engages with the base.

[0019] Preferably, the positive engagement occurs when force is applied to the front of the unit, more preferably at the front between the lid and the base.

[0020] Thus the positive engagement means increases the security of the locked cash storage unit and makes it more difficult for an unauthorised person to gain access to the interior of the unit and the contents. With the positive engagement means provided at the most vulnerable part of the unit the increased security is achieved with the minimum of extra materials. This is advantageous as manufacturing costs can be kept low.

[0021] Preferably the lid comprises an angled lip portion fitting within the base.

[0022] The engagement means may comprise a flange positioned within the base, preferably substantially parallel to the front face of the unit and arranged with running clearance between the angled portion of the lid. Preferably, any force applied to the lid greater than a predetermined amount will plastically deform the lid and the lid and flange means will positively engage.

[0023] The flange may further comprise a protrusion angled at substantially 45° to the vertical plane. The flange may be stronger than the base, preferably at least 20-100% stronger, more preferably at least 50% stronger. The flange may comprise material of greater strength than the material used for the construction of the other parts of the cash storage unit such as the lid. Preferably the material is aluminium or mild steel or any other suitable material providing greater strength and rigidity than the remainder of the cash storage unit.

[0024] Alternatively the flange may be constructed of the same material as the other parts of the cash storage unit, but be thicker than the material used in the construction other part of the base. Preferably the flange deforms elastically when force is applied.

[0025] In an alternative embodiment the positive engagement means may comprise a U shaped lip in the form of a hem on the lid and a U shaped lip in the form

of a hem on the flange of the base.

[0026] In accordance with a further aspect the present invention provides a cash storage unit comprising a housing and a drawer, the housing comprising a lid and a base mounted via hinge means or the like, the drawer including a plurality of compartments for storing cash, the lid being movable by operation of the hinge means between a closed position and an open position and locking means for locking the lid in a closed position, wherein means are provided on the lid and/or on the base such that when a force greater than a predetermined force is applied in a direction to move the lid from the closed position to the open position the lid positively engages with the base.

[0027] In embodiments where the lid is designed to deform to engage with engagement means on the base, the engagement means on the base is preferably formed from material, e.g. metal, which is at least twice as strong as the material of the lid. For example, the lid may be formed e.g. from 1-1.5mm thick mild steel, whereas at least parts of the base (such as the engaging means) may be formed from 3-4mm thick stainless steel.

[0028] In order to assist the engagement function, the lid may optionally be provided with a flexure means. This may take the form of a flexure hinge, which is preferably at or near the rear of the lid, adjacent or near the operating hinge.

[0029] The lid may be configured to move from the closed position to the open position under the action of a spring means or a counterbalance means. The lid can then be closed manually by the operator, against the spring force. Alternatively, a motor may be provided to open and/or close the lid.

[0030] The cash storage unit may additionally comprise signal receiving means for receiving a signal command to open and/or close the lid. This signal may be provided by e.g. the computer terminal or the keyboard, either automatically or as a result of an operator command.

[0031] The invention also extends to a cash register comprising a cash storage unit as described above, and also to a retail check-out system comprising such a cash storage unit. As mentioned previously, the retail check-out system may include one or more of the following modules: input conveyor, output conveyor, barcode scanner, display(s), weighing means, card swipe unit, computer terminal, keyboard, printer.

[0032] Embodiments of the present invention will now be described by way of example only, and with reference to the accompanying drawings, in which:

Fig. 1 shows a perspective view of a cash storage unit in accordance with the invention, with the drawer in a closed position;

Fig. 2 shows a perspective view of a cash storage unit in accordance with the invention, with the draw-

er in a slightly open position;

Fig. 3 shows a side elevation cross-sectional view of a cash storage unit in accordance with the invention, with the drawer in a closed position;

Fig. 4 shows a side elevation cross-sectional view of the cash storage unit of Fig. 3 with the drawer in a slightly open position;

Fig. 5 shows a side elevation cross-sectional view of the cash storage unit of Fig. 3 with the drawer in a slightly further open position;

Fig. 6 shows a side elevation cross-sectional view of another embodiment of a cash storage unit in accordance with the invention, with the drawer in a slightly open position;

Fig. 7 shows a side elevation cross-sectional view of another embodiment of a cash storage unit in accordance with the invention, with the drawer in a closed position; and

Figs. 8 (a) and (b) show a side elevation cross-sectional view of the cash storage unit of Figure 7 under attack.

[0033] With reference to Fig. 1, the cash storage unit shown generally as 10 comprises a lid 20 having planar sides and a base 30. The unit 10 is shown in a closed position. The lid 20 is mounted to the base 30 via hinge means 40 positioned towards the back of the unit and not visible in this Figure. The lid 20 and the base 30 are moveable from a closed to an open position via the hinge means 40. The unit 10 may be locked in the closed position by locking means, for example a key-operated lock 31. A slot 32 is provided in the front panel of the base 30, to allow the insertion of e.g. credit card slips or cheques without the necessity to open the unit 10.

[0034] Fig. 2 shows a slightly different base front, but the principles of use are the same as for the drawer of Fig. 1, as will be described below. In Fig. 2, the unit 10 is shown in a slightly open position. When fully open the top surface 220 of lid 20 is at substantially 90 degrees to the lower surface 320 of the base 30. Lid 20 is configured to move between the closed position (Fig. 1) and the fully open position by means of hinge 40 not shown in this Figure.

[0035] Turning to Figs. 3 to 6, the internal components and the operation of the cash storage unit in accordance with the invention will now be described.

[0036] Figures 3 to 5 show the unit opening from a closed position (Fig. 3) with the top surface 220 of the lid 20 substantially parallel to the lower surface 320 of the base, to a more open position (Fig. 5) where the top surface 220 of the lid 20 is no longer substantially parallel to the lower surface 320 of the base and where

there is at an acute angle between surface 220 and surface 320. Fig. 4 shows an intermediate open position between the positions shown in Fig. 3 and Fig. 5 with the lid 20 in a slightly less open position than shown in Fig. 5. In Fig. 4 the top surface 220 of the lid 20 is no longer substantially parallel to the lower surface 320 of the base (as shown in Fig. 3) and there is a smaller acute angle between surface 220 and surface 320 than in Fig. 5.

[0037] Figs. 3 to 5 show that when unit 10 is closed an angled lip portion 210 of front panel 200 of lid 20 is positioned within base 300, within recess 33. Lip 210 is arranged to provide at least a running clearance between flange 310 (also shown in Fig. 2) and security plate 50. Fig. 6 shows a different embodiment of the present invention with part of the front panel 300 of base 30 formed into a flange 310 providing a larger recess 33. **[0038]** Fig. 3 shows security plate 50 mounted to base 30 via bolt 60 and support strip 70. The plate 50 comprises a base portion 52, a back portion 54 and a front portion 56. The base 52 and back 54 portions are essentially straight and configured to be at right-angles to one another with the back portion 54 arranged substantially parallel to the front surface 300 of the base 30. Plate 50 is constructed of one or more pieces of strong metal e.g. cast steel. The front portion 56 of plate 50 is arranged parallel to the back portion 54 by folding part of the plate 50 back on itself to form a hem or clamping or otherwise securing the front portion 56 to the back portion 54 at the distal end 500 of plate 50.

[0039] Plate 50 is of a stronger construction than lip 210. Lip 210 should deform plastically under a predetermined force. Plate 50 is of a construction such that it only deforms elastically under a predetermined force greater than the force at which lip 210 deforms.

[0040] Figure 7 shows an alternative embodiment of the unit 10 of the present invention with the unit 10 shown in a closed position, and the lid under an external force. As described in Figs. 1-6 when unit 10 is closed a portion of the lower edge of front panel 200 of lid 20 is positioned within base 300. In this embodiment the shape and fixing construction of security plate 50 is different to that shown in Figs. 3 to 5, but the structure of plate 50 serves the same purpose and as in Figs. 3 to 5 with the back portion 54 arranged substantially parallel to the front surface 300 of the base 30. Plate 50 is mounted to base 30 via bolt 60 and support strip 70. Support strip 70 additionally acts as a spacer. The arrangement of flange 310 and security plate 50 provides recess 33. When unit 10 is closed a portion of the lower edge 217 of front surface 200 of lid 20 is positioned within this recess 33.

[0041] Further details of the security plate and the front surface of the lid will now be described. The lower edge 217 of front surface 200 of lid 20 is formed into a hem 215 by folding the lower edge 217 of the front surface 200 back on itself to make a U-shaped engaging surface. A corresponding hem 216 is formed on security

plate 50 using the same method of construction.

[0042] In use hem 215 is arranged to have a running clearance between flange 310 and security plate 50, but in the Figure the hem 215 is shown interlocking with the corresponding hem 216 on security plate 50, as in the forced condition.

[0043] As in the previous embodiments plate 50 is of a stronger construction than front surface 200 of lid 20. The lower edge 217 of front surface 200 forming hem 215 should deform plastically under a predetermined force. Plate 50 including hem 216 is of a construction such that it only deforms elastically under a predetermined force, that force being greater than the force at which front surface 200 deforms. Thus plate 50 provides a more rigid structure than surface 200.

[0044] The construction of the unit set out in the above description and shown in Figs. 1 to 7 is designed so that in use it presents a hindrance to opening by force, for example force exerted via a lever in between the lid and the base. The operation of the unit in such circumstances will now be described with reference to Figs. 8 (a) and (b).

[0045] Figs. 8 (a) and (b) show the embodiment of unit 10 as shown in Fig. 7 closed and locked with locking means such as key-operated lock 31 (shown in Fig. 1). The unit 10 is under attack by an unauthorised person with a screwdriver 800 or other lever means. In Fig. 8 (a) the screwdriver 800 is inserted into recess 33 formed between flange 310 and security plate 50. In Fig. 8(b) force is applied to the screwdriver 800 in a downwards direction (from the lid 20 in the direction on the base 30) in an attempt to prise the unit open. However, this action causes the front surface 200 of lid 20 to deform plastically causing the lower edge 217 of front surface 200 forming hem 215 to positively engage with the corresponding hem 216 of plate 50. Edge 217 is shown in Fig. 8 (b) abutting edge 218. As plate 50 is of a stronger more rigid construction than lid 20 it does not deform under the force typically exerted by an attacker with a screwdriver or other lever means. Alternatively the plate 50 deforms elastically at a force greater than the force at which front surface 200 deforms. Thus the positive engagement of hem 215 and hem 216 prevents the opening of lid 20 from the base 30.

[0046] Referring back to Figs. 3 to 6 the security plate 50 and lip 210 will work in the same way as hem 215 and hem 216 of the embodiment shown in Fig. 7. Under attack from a screw driver 800 inserted into recess 33 and forced in a downwards direction against lip 210. Lip 210 will deform plastically and will positively engage with front portion 56 of plate 50. Plate 50 as described above is made of a stronger construction than lip 210. Fig. 6 shows a front portion with a hem constructed by folding the front surface 56 back on itself to make a U-shape. Figs. 3 to 5 show front portion 56 of security plate 50 with an angled tip 560 as the positive engaging surface.

[0047] It will be appreciated that the above described embodiments are given by way of example only and that

various modifications thereto may be made without departing from the scope of the invention. For example, the hinge means could also comprise lifting means and the material of the unit could be any suitable plastics or metal.

Claims

1. A cash storage unit comprising:

a base for containing the contents of the unit;
a lid for covering the contents when in a closed position; and
locking means for locking the lid in the closed position;

wherein the lid and/or base are deformable such that, when force is used to try to separate the lid and base when locked together, the lid and base engage to retain the lid in the closed position.

2. A cash storage unit as claimed in claim 1 further **characterised in that** the lid is mounted to the base by means of a hinge.

3. A cash storage unit as claimed in claim 1 or 2 further **characterised in that** the engagement between the lid and base serves to interlock the lid and base.

4. A cash storage unit as claimed in any preceding claim, further **characterised in that** the lid and/or base is elastically or plastically deformable to achieve the described engagement.

5. A cash storage unit as claimed in any preceding claim further comprising engaging means located on the lid and/or on the base.

6. A cash storage unit as claimed in claim 5 wherein the engaging mean comprises a projection, flange, recess, plate, lip, hem or fold.

7. A cash storage unit as claimed in claim 5 wherein the engaging means is provided on the lip of the lid and/or on the side of the lid.

8. A cash storage unit as claimed in any of claims 5 to 7 wherein the engaging means is provided on the corresponding portions of the base.

9. A cash storage unit as claimed in any preceding claim wherein the lid is deformable so as to engage with the base when forced.

10. A cash storage unit as claimed in claim 9 wherein the lip of the lid, or a region adjacent the lip of the lid is deformable.

11. A cash storage unit as claimed in claim 9 or 10 wherein the lid is provided with engaging means.
12. A cash storage unit as claimed in claim 11 wherein the engaging means is a flange or hem.
13. A cash storage unit as claimed in claim 12 wherein said flange or hem is folded inside the lid.
14. A cash storage unit as claimed in any preceding claim, further **characterised in that** the base is configured to be relatively rigid or undeformable, so that the lid deforms in preference to the base.
15. A cash storage unit as claimed in claim 14 wherein the base is provided with engaging means with which the lid engages when deformed.
16. A cash storage unit as claimed in claim 15 wherein the base engaging means comprises a recess, flange, projection or hem with which the lid or the lid engaging means engages under force.
17. A cash storage unit as claimed in any preceding claim, further comprising means to strengthen the base, located on the base.
18. A cash storage unit comprising:
- a housing; and
 - a drawer for storing cash;
 - the housing further comprising a lid and a base wherein the lid is mounted to the base via hinge means and locking means for locking the lid in a closed position;
- wherein the lid positively engages with the base when force is applied to the lid in a closed position.
19. A cash storage unit as claimed in claim 18 wherein engagement means are provided on the lid and/or on the base such that the lid positively engages with the base when force is applied to the lid when the lid is in a closed position.
20. A cash storage unit as claimed in claim 18 or 19 wherein positive engagement occurs when force is applied to the front of the unit.
21. A cash storage unit as claimed in claims 18 to 20 wherein positive engagement occurs when force is applied to the front of the unit between the lid and the base.
22. A cash storage unit as claimed in claims 18 to 21 wherein the lid comprises an angled lip portion fitting within the base.
23. A cash storage unit as claimed in claim 22 wherein the engagement means comprises a flange positioned within the base.
24. A cash storage unit as claimed in claim 23 wherein the flange is substantially parallel to the front face of the unit and is arranged with running clearance between the angled portion of the lid.
25. A cash storage unit as claimed in claim 23 or 24 wherein the lid is plastically deformed and the lid and flange means engage positively if any force greater than a predetermined amount is applied to the lid.
26. A cash storage unit as claimed in any of claims 23 to 25 wherein the flange further comprises a protrusion angled at substantially 45° to the vertical plane.
27. A cash storage unit as claimed in any of claims 23 to 26 wherein the flange is stronger than the base.
28. A cash storage unit as claimed in any of claims 23 to 27 wherein the flange is at least 20-100% stronger than the base.
29. A cash storage unit as claimed in any of claims 23 to 28 wherein the flange is 50% stronger than the base.
30. A cash storage unit as claimed in any of claims 23 to 29 wherein the flange comprises material of greater strength and/or rigidity than the material used for the construction of the other parts of the cash storage unit.
31. A cash storage unit as claimed in any of claims 23 to 30 wherein the flange is made of aluminium or mild steel.
32. A cash storage unit as claimed in any of claims 23 to 29 wherein the flange is constructed of the same material as the other parts of the cash storage unit, but is thicker than the material used in the construction other part of the base.
33. A cash storage unit as claimed in claim 32 wherein the flange deforms elastically when force is applied.
34. A cash storage unit as claimed in any of claims 18 to 33 wherein the positive engagement means comprises a U shaped lip in the form of a hem on the lid and a U shaped lip in the form of a hem on the flange of the base.
35. A cash storage unit comprising:
- a housing further comprising:

a lid and a base mounted via hinge means or the like; wherein the lid is movable by operation of the hinge means between a closed position and an open position;

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locking means for locking the lid in a closed position, wherein means are provided on the lid or on the base or on both such that when a force greater than a predetermined force is applied in a direction to move the lid from the closed position to the open position the lid positively engages with the base; and

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a drawer including a plurality of compartments for storing cash.

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36. A cash storage unit as claimed in claim 35 further **characterised in that** the lid is designed to deform to engage with engagement means on the base; and

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the engagement means on the base is formed from material, which is at least twice as strong as the material of the lid.

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37. A cash storage unit as claimed in claim 35 or 36 wherein the lid is provided with a flexure means.

38. A cash storage unit as claimed in claim 37 wherein the flexure means is a flexure hinge.

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39. A cash storage unit as claimed in claim 38 wherein the flexure hinge is located at or near the rear of the lid, adjacent or near the operating hinge.

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40. A cash storage unit as claimed in any of claims 35 to 39 wherein the lid is configured to move from the closed position to the open position under the action of a spring means or a counterbalance means.

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41. A cash storage unit as claimed in any of claims 35 to 40 wherein the lid is configured to be closed and/or opened by means of a motor.

42. A cash storage unit as claimed in any of claims 35 to 41 further comprising signal receiving means for receiving a signal command to open and/or close the lid.

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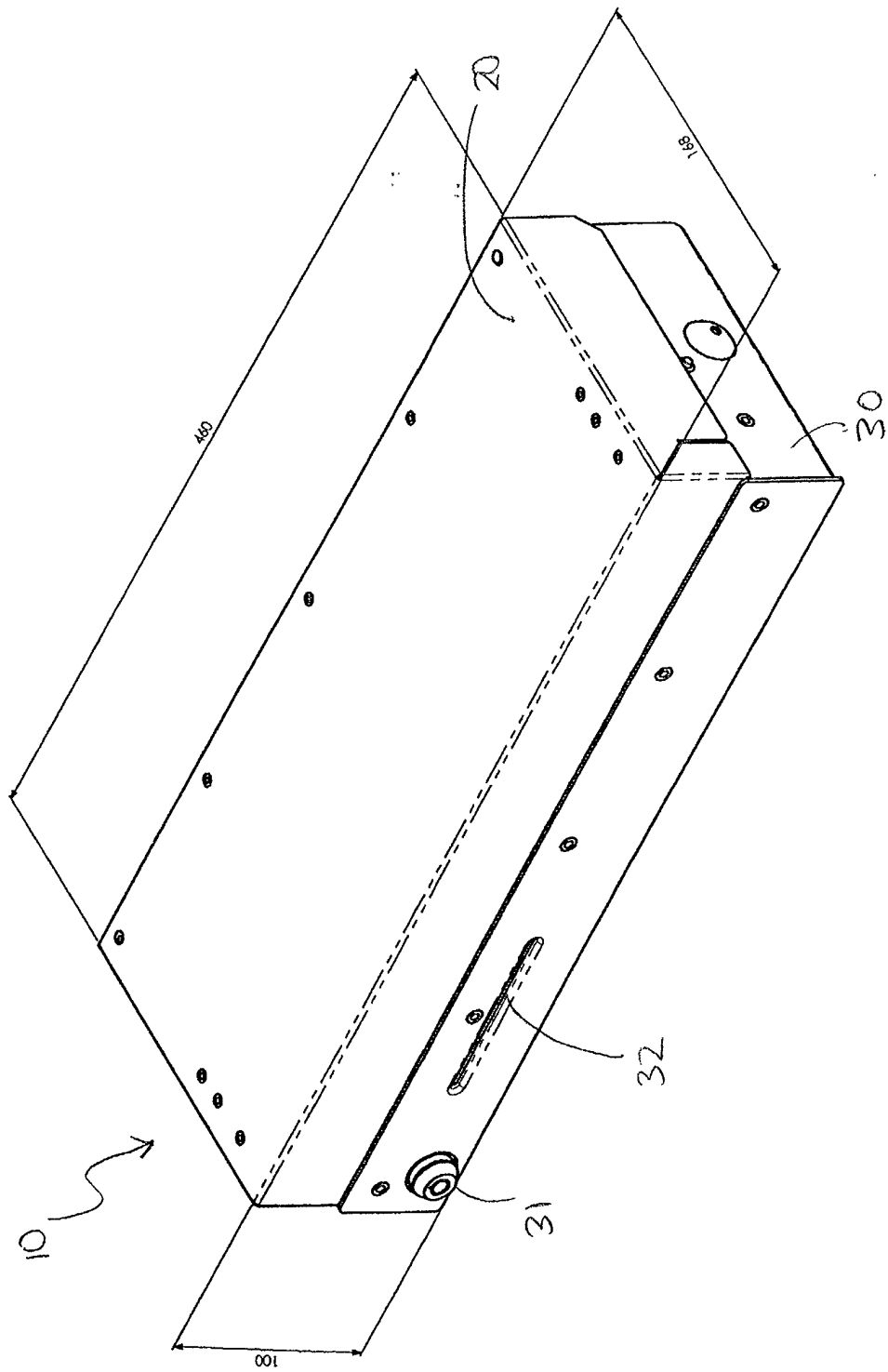
43. A cash register comprising a cash storage unit according to any of the preceding claims.

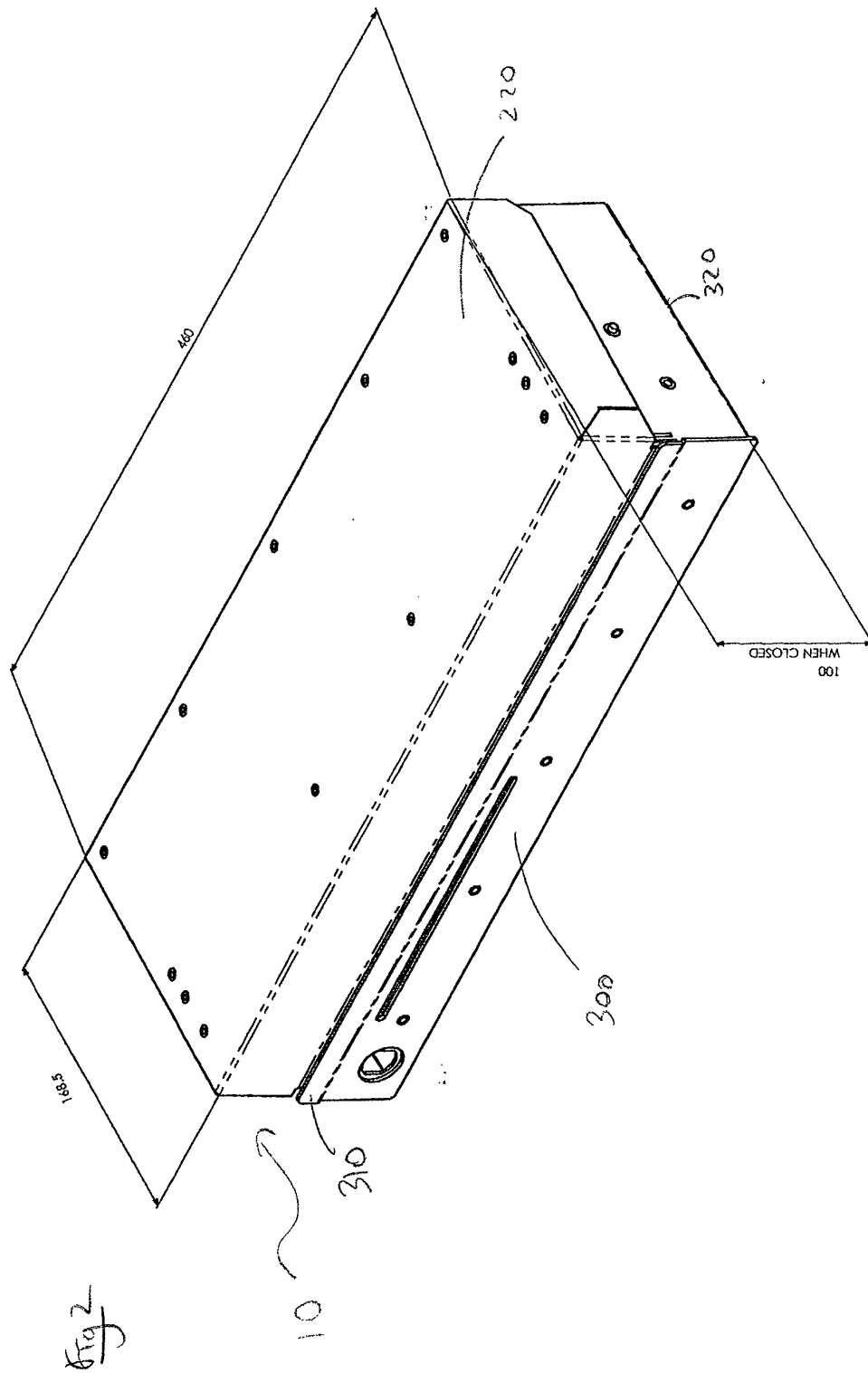
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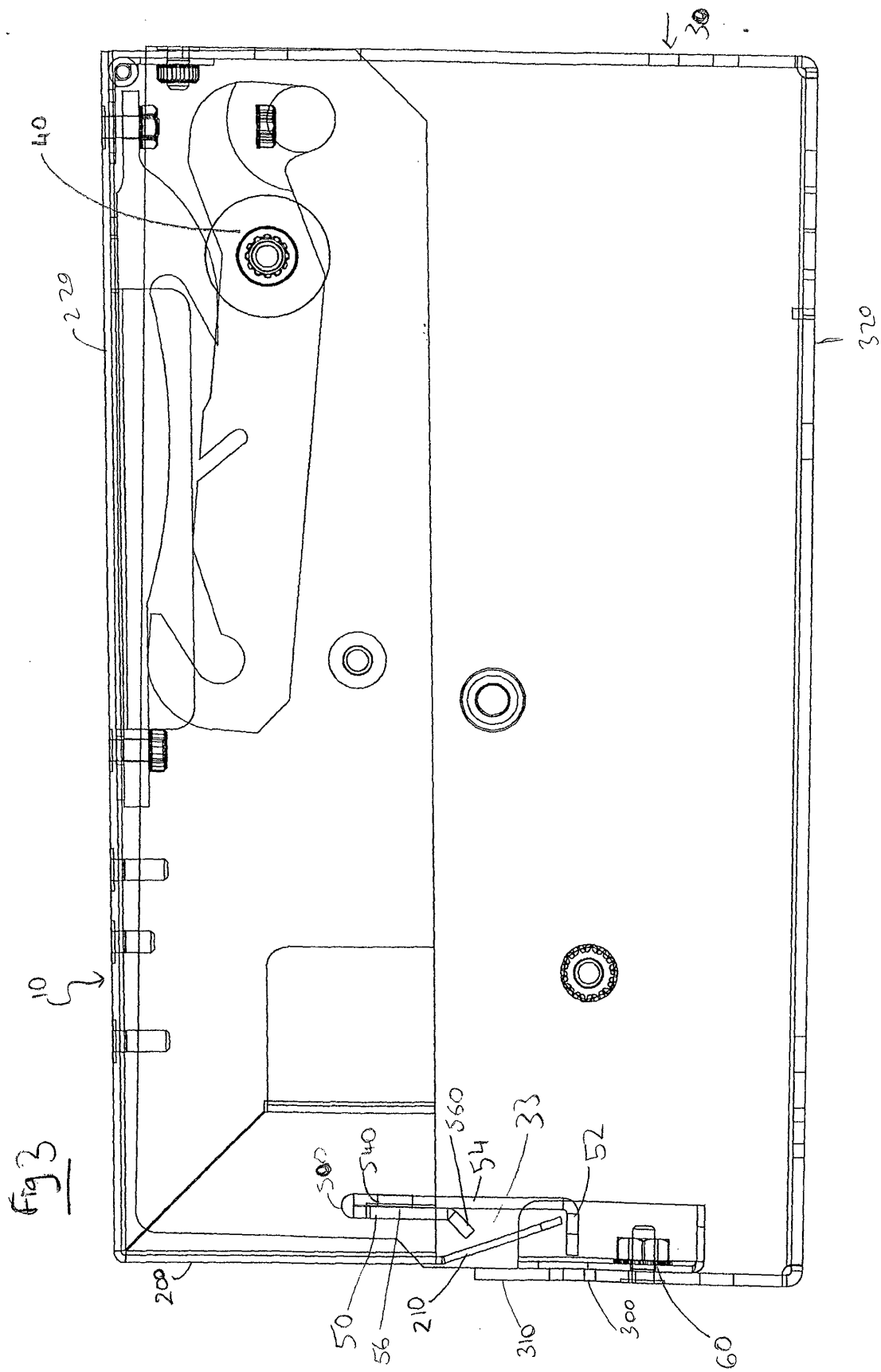
44. A cash storage unit comprising a base and a lid for the base, the base and the lid being so formed as to engage each other so as to prevent opening of the lid in the event of force being applied to separate the lid and base when the lid is closed.

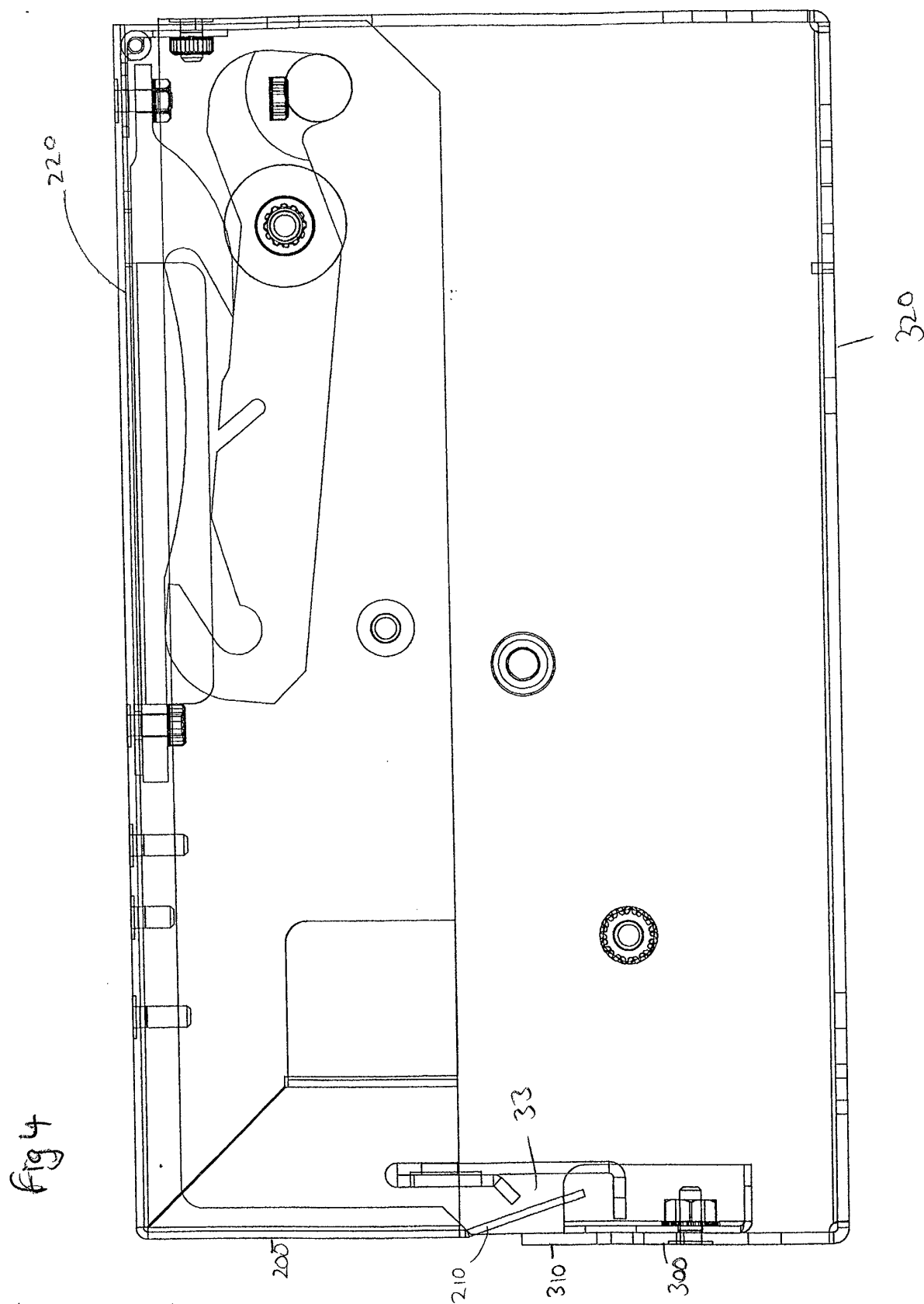
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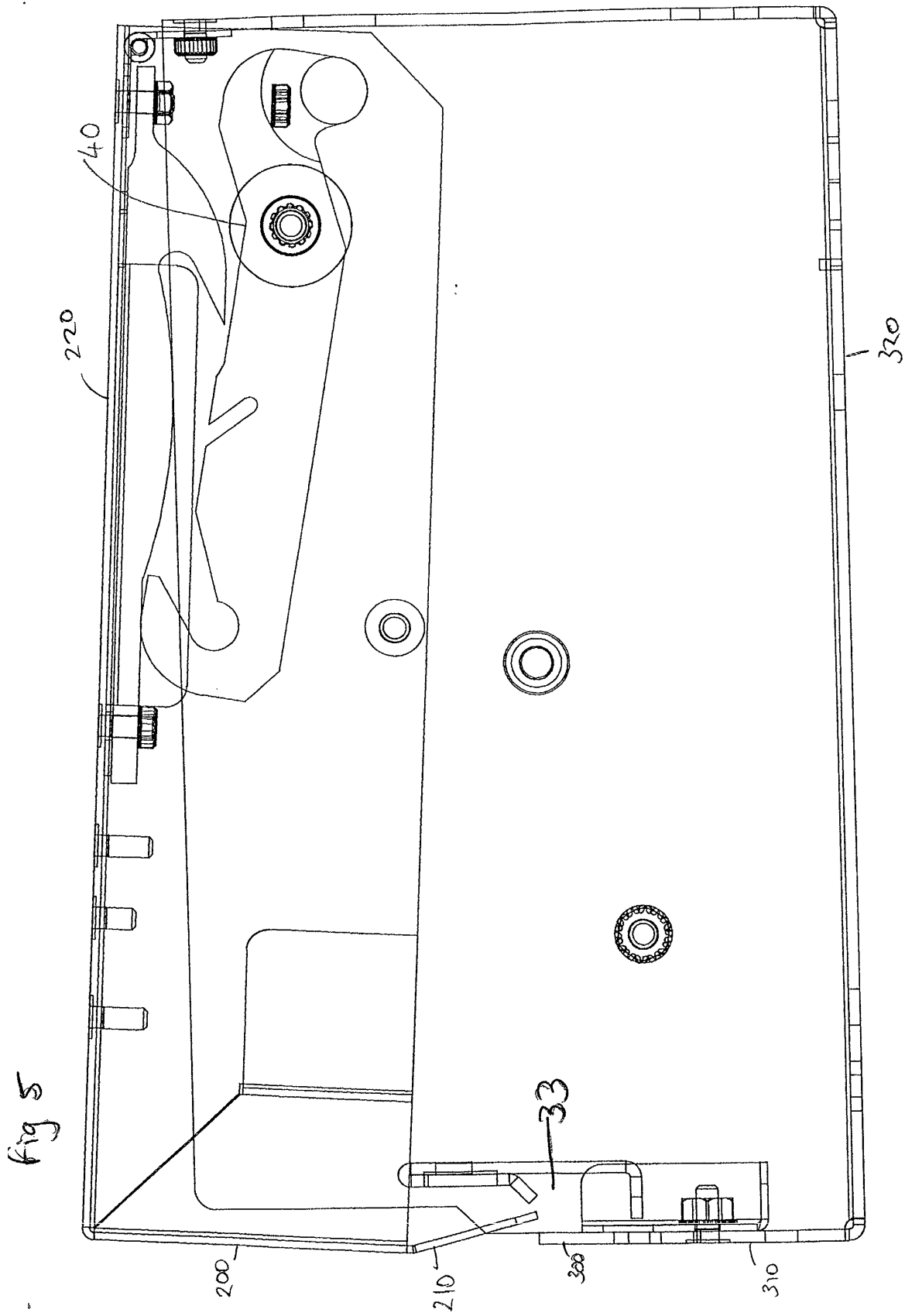
fig 1.











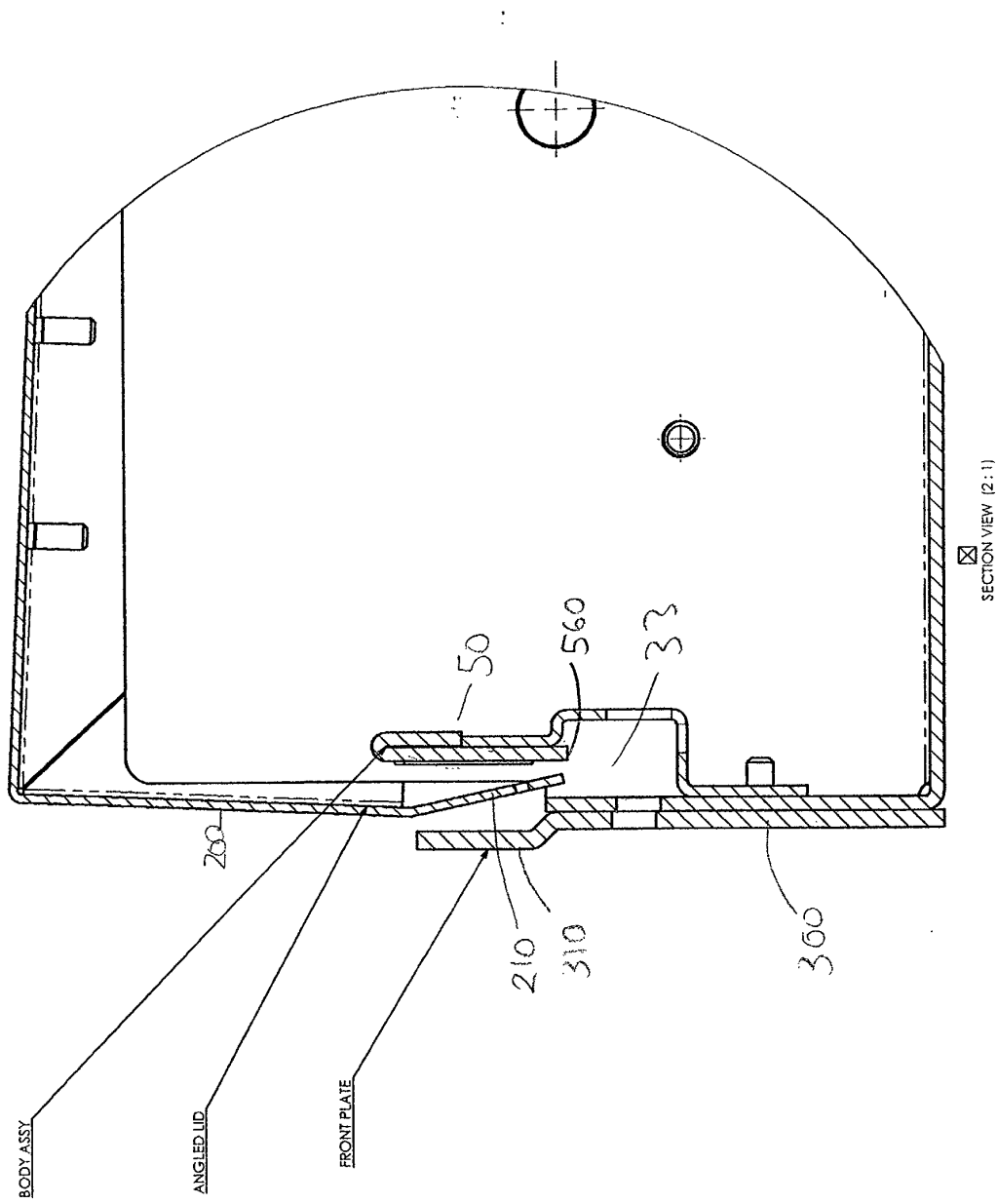
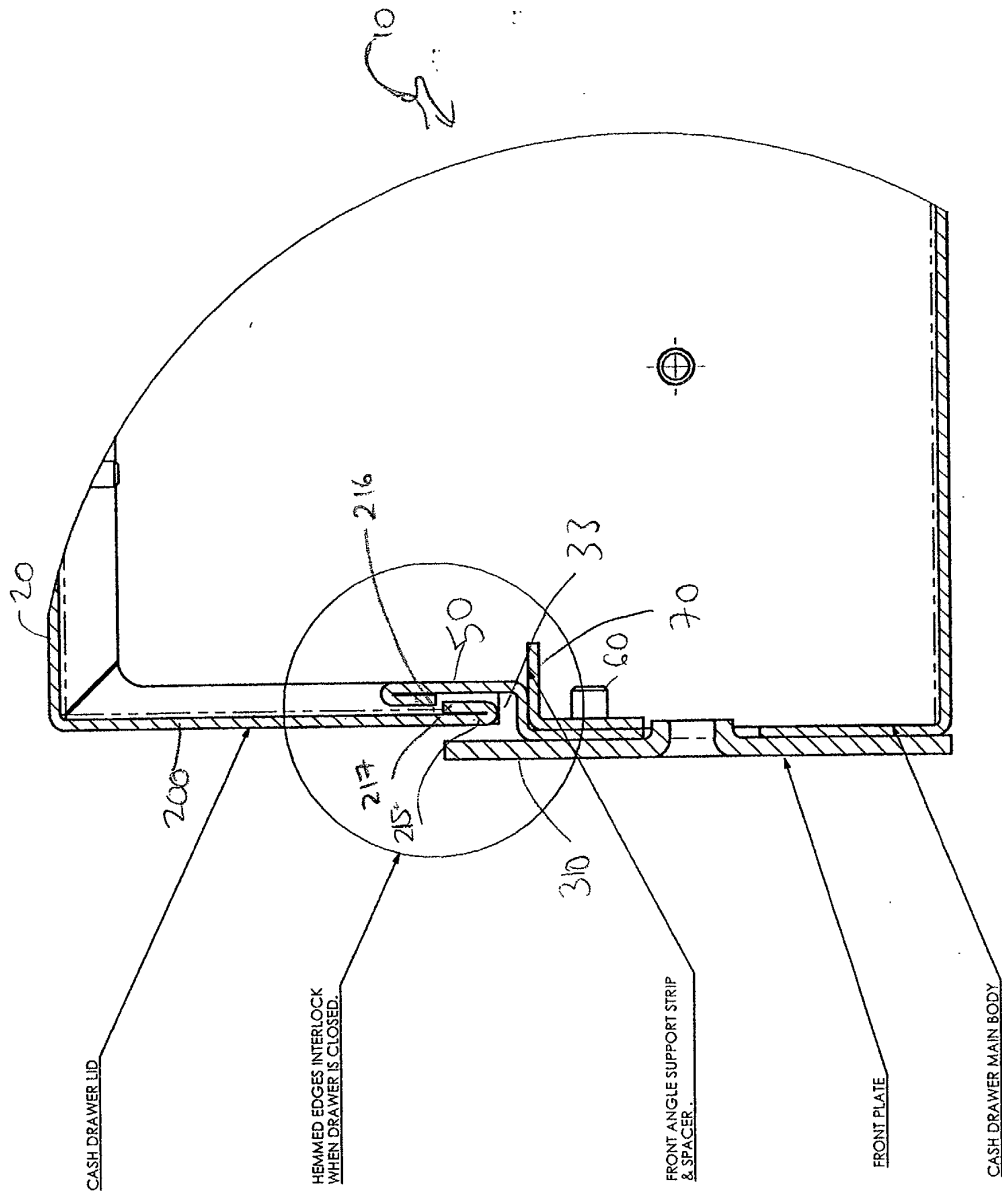


fig 6



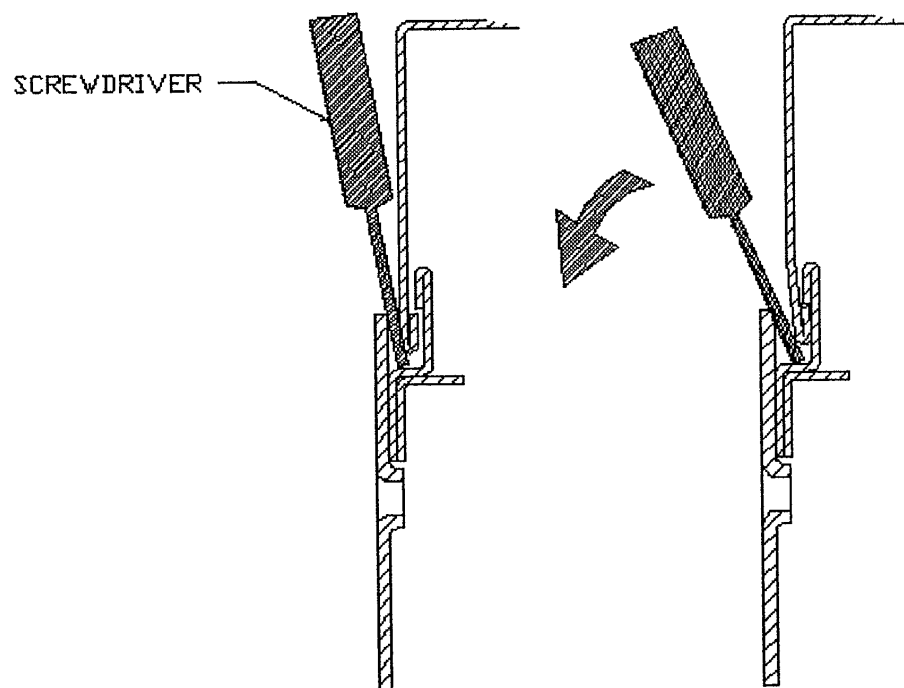


FIG. 8