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### Lockers

The present invention relates to lockers. In particular  
15 the invention is concerned with the construction of  
arrays of safe deposit lockers such as may be installed  
in bank vaults and the like secure locations. In  
principle, however, the invention is applicable to the  
construction of locker arrays for any useful purpose such  
20 as may be found in schools, sports facilities, transport  
termini etc.

More particularly, the invention is concerned with  
lockers which may be manufactured and delivered in kit  
25 form, for assembly on-site. It is an aim of the  
invention to provide lockers of this form which can be  
manufactured in various configurations from inexpensive  
components and assembled rapidly with minimal skill or  
use of special tools.

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Accordingly in a first aspect the invention resides in a  
kit of parts adapted to be assembled into a rectangular  
array of lockers, comprising: separate panels adapted to  
form respectively the two sides, top, bottom and back of  
35 a rectangular carcass; at least one internal panel  
adapted to extend vertically from top to bottom of the  
carcass to divide the interior thereof into columns; at  
least one internal panel adapted to extend horizontally  
from side to side of the carcass to divide the interior  
40 thereof into rows; and a plurality of doors, one for

each locker; said internal vertical and horizontal panels being slit so as to interfit orthogonally with one another; and respective said panels being configured such that in the assembled condition said internal panels  
5 can be fastened to said top and/or bottom and/or back and/or side panels, said top and/or bottom panels can be fastened to said side and/or back panels, and/or said back panel can be fastened to said side panels, by means of a plurality of tangs on one such panel passing through  
10 respective slots in the other such panel and being treated, preferably by twisting or other plastic deformation, to prevent return passage of said tangs through said slots.

15 In a preferred embodiment said doors are assembled to said carcass by snap-fitting hinge means. More particularly there may be a plurality of profile strips adapted to be attached to the front vertical edges of said vertical internal panel(s) and of at least one said  
20 side panel, each said profile strip defining a first partial journal bearing surface; each said door having a second partial journal bearing surface; one of said first and second partial journal bearing surfaces being a male surface while the other such surface is a female  
25 surface, and at least said female surface is moulded in plastics material. Each said door can thus be hingedly assembled to a respective said profile strip by snapping a respective said male and female surface together.

30 The invention also resides *per se* in a method of assembling an array of lockers from a kit according to the above-defined first aspect of the invention, and in the lockers thereby assembled.

35 The invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:



Figure 1 is a schematic perspective view of the assembled carcass of a safe deposit locker array in one example of the invention;

- 5 Figure 2 illustrates the configuration of the side panels used in the carcass of Figure 1;

Figure 3 illustrates the configuration of the top and bottom panels used in the carcass of Figure 1;

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Figure 4 illustrates the configuration of the back panel used in the carcass of Figure 1;

- 15 Figure 5 illustrates the configuration of the internal vertical panels used in the carcass of Figure 1;

Figure 6 illustrates the configuration of the internal horizontal panels used in the carcass of Figure 1;

- 20 Figure 7 illustrates, to an enlarged scale, the configuration of the tangs provided on each of the panels of Figures 3 to 6; and

- 25 Figure 8 is a horizontal cross-section through a door and adjacent carcass parts in a fully assembled locker array.

Referring to Figure 1, the illustrated carcass defines an array of 48 equally sized safe deposit lockers 1 arranged in three columns of sixteen lockers each. It is  
30 assembled from two identical side panels 2, identical top and bottom panels 3, a back panel 4, two identical internal vertical panels 5 and fifteen identical internal horizontal panels 6. All of the panels 2-6 may be  
35 essentially flat except for the front edges of the panels 3 and 6 which are folded over to avoid any sharp edges being presented to the users of the lockers 1.



The configuration of each side panel 2 is shown in Figure 2. It is of rectangular form with a series of eight vertical slots 7 pierced close to the rear edge of the panel, a series of sixteen pairs of holes 8 drilled close to the front edge of the panel, and a series of seventeen rows of three horizontal slots 9 pierced at spaced positions between the front and rear edges of the panel.

The configuration of each top and bottom panel 3 is shown in Figure 3. It is of essentially rectangular form with a series of three tangs 10 extending from each side edge of the panel, a series of six side-to-side slots 11 pierced close to the rear edge of the panel, and two rows of three slots 12 pierced at spaced positions between the front and rear edges of the panel. Slightly offset from the slots 12 and spaced inwards of the front edge of the panel are two further, wider slots 13. A vestigial slot 13 is also provided in the left hand (as viewed) side edge of the panel. The front portion 14 of the panel forward of the slots 13 is slightly wider than the rest of the panel, projecting laterally by the same dimension as the tangs 10, and this portion also represents an increase in the depth of the panel from front to back as compared with the side panels 2.

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The configuration of the back panel 4 is shown in Figure 4. It is of essentially rectangular form with a series of eight tangs 15 extending from each side edge of the panel and a series of six tangs 16 extending from both the top and bottom edges of the panel. A series of fifteen rows of six horizontal slots 17 are pierced at spaced positions between the two side edges of the panel and two columns of eight vertical slots 18 are pierced at positions between the top and bottom edges of the panel. The height of this panel (excluding tangs 16) corresponds to the distance between the upper and lower rows of slots 9 in the side panels 2 and the width of this panel (excluding tangs 15) corresponds to the width of the main part of the top and bottom panels 3 (excluding tangs 10).



The configuration of each internal vertical panel 5 is shown in Figure 5. It is of essentially rectangular form with a series of eight tangs 19 extending from the rear edge of the panel and a series of three tangs 20 extending from both the top and bottom edges of the panel. A series of fifteen horizontal slits 21 extend from the front edge of the panel to its mid depth and a series of sixteen pairs of holes 22 are drilled close to the front edge of the panel. The height of this panel (excluding tangs 20) corresponds to that of the back panel 4 (excluding tangs 16) and its depth from front to back (excluding tangs 19) corresponds to that of the side panels 2.

The configuration of each internal horizontal panel 6 is shown in Figure 6. It is of essentially rectangular form with a series of three tangs 23 extending from each side edge of the panel and a series of six tangs 24 extending from the rear edge of the panel. Two slits 25 extend from the rear edge of the panel to a little over its mid depth, at widthways positions corresponding to those of the slots 12 in top and bottom panels 3. Slots 26 are pierced in the panels 6 corresponding to the slots 13 in the panels 3 and the front portion 27 of each panel 6 also corresponds to the form of the front portion 14 of the panels 3. The width of panel 6 (excluding tangs 23) corresponds to that of panel 3 (excluding tangs 10) and the depth of panel 6 (excluding tangs 24) corresponds to the depth of panel 3 from its front edge back to the slots 11.

It will be appreciated from the Figures that the tangs 10, 15, 16, 19, 20, 23 and 24 extending from the panels 3, 4, 5 and 6 are destined to be received in respective slots in another one of the panels. A preferred form for each such tang is shown to an enlarged scale in Figure 7. It comprises a central head 70 extending via a neck portion 71 from the edge of the respective panel,



with a short tab 72 located to each side of the tang and also extending slightly from the panel edge. The purpose of the tabs 72 is to ensure that the head 70 is centred in the corresponding slot before twisting.

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To assemble the carcass of Figure 1, the internal vertical and horizontal panels 5 and 6 are first taken and interlinked through their respective slits 21 and 25 to form a "honeycomb" structure. That is to say the front portion of each horizontal panel 6 is supported in a respective slit 21 of both vertical panels 5 while the rear portion of each vertical panel 5 passes through a respective slit 25 of each horizontal panel 6. This structure is then assembled to the back panel 4 by placing the panel 4 over the rear edges of the panels 5 and 6 so that the tangs 19 and 24 of the latter pass through respective slots 18 and 17 in the back panel. These tangs are then plastically deformed by a twisting motion so that their heads 70 become misaligned with the respective slots and clench the panel 4 to the assembly of panels 5 and 6. All that is required for this purpose is a simple tool in the nature of a socket wrench having as its socket a diametral slot dimensioned to fit over the tang.

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Next the top and bottom panels 3 are added. They are placed in turn over the existing structure so that respective tangs 16 and 20 of the back panel 4 and internal vertical panels 5 pass through respective slots 11 and 12 in the respective panel 3, these tangs being twisted to fasten on the panels 3 in the same manner as described above. To complete the carcass assembly the two side panels 2 are added. They are placed in turn over the existing structure so that respective tangs 15, 10 and 23 of the back panel 4, top and bottom panels 3 and internal horizontal panels 6 pass through respective slots 7 and 9 in the respective panel 2, these tangs being twisted to fasten on the panels 2 in the same manner as described above.



With respect to the subsequent addition of doors 28 for each locker 1, reference will be made to Figure 8. In respect of each front vertical edge of the carcass, that is to say the front edges of side panels 2 and internal vertical panels 5, the components indicated at 29 and 30 in Figure 8 are first added. Each component 29 is a continuous length of rectangular steel strip extending throughout the height of the respective panel edge to add rigidity to the structure. In respect of each internal vertical panel 5 and the lefthand (as viewed) end panel 2 the respective strip 29 is fed endwise through respective slots 13 and 26 in the top, internal horizontal and bottom panels 3 and 6 so as to lie adjacent to the respective front vertical panel edge, while for the right hand (as viewed) end panel 2 the respective strip 29 can simply be placed behind the shoulders 14A and 27A (Figures 3 and 6) of the projecting front portions of the panels 3 and 6. Each component 30 is a respective length of extruded aluminium alloy of the profile illustrated in Figure 8, cut to fit over the portions of each edge of vertical panels 2 or 5 between adjacent horizontal panels 3 and 6. The ends of the profile strips 30 are notched to take account of the thickness of the front edges of the panels 3 and 6 so that the strips 30 collectively present a continuous front face 31 along each vertical panel edge. The strips 29 and 30 are drilled with holes to align with respective pairs of holes 8 or 22 in the front edges of vertical panels 2 and 5 and are secured in place by means of rivets 32 or other suitable fasteners through the aligned holes.

In the illustrated embodiment, each door 28 is formed from a tray-like plastics moulding 33. A conventional dual-key safe deposit locker lock 34 is mounted in the tray 33 adjacent to the opening side edge of the door and the rear of the door is closed by a screwed-on cover plate 35. A lateral rib 36 on the profile strip 30 at the opening side of the door serves as the stop surface



for the door and as the detention for its lock bolt 37. At the hinge side, the plastics moulding 33 is formed with a part-cylindrical socket portion 38 having an included angle over  $180^{\circ}$ , and the door is mounted by means of this socket on a part-cylindrical head 39 on the profile strip 30 at that side of the door, the head 39 and socket 38 thus forming the male and female bearing surfaces of a journal hinge. By virtue of the resilience of the plastics material (e.g. ST nylon or polycarbonate) from which the doors 28 are moulded, each door can be assembled to its respective locker simply by snapping the respective socket 38 onto the respective head 39. It will be appreciated from Figure 8, however, that the orientation of the socket 38 with respect to the profile of the strip 30 is such that assembly of the socket 38 to the head 39 can be achieved only with the door in an open position. Equally, a door 28 could be unsnapped from its strip 30 only when already opened, so this simple means of assembly does not prejudice the security of the lockers. More particularly, in the illustrated closed position of the door 28 its hinge side is blocked by the strip 30 from being displaced inwards in any attempt to separate the hinge.

25 In an alternative embodiment to the all-plastics door structure described, steel doors equipped with plastics hinge blocks functionally equivalent to the socket 38 may be employed instead.

30 It will be appreciated that the completed array of lockers 1 as thus far described will have exposed tangs on its top, bottom, side and rear surfaces. For proper load-bearing support, the array can be placed on a plinth comprising a simple steel frame shaped to avoid fouling any of the tangs extending through the bottom panel 3.

35 If arrays of this kind are to be stacked on top of each other a similar frame can be interposed between them. If in any particular installation the side or rear face of such an array is left exposed it can be covered by a



simple trim plate clipped or riveted onto the respective panels 2 or 4.

It will be appreciated that the illustrated embodiment  
5 represents but one configuration of an array of lockers  
which may be produced in accordance with the invention.  
The numbers and sizes of lockers in any such array is  
open to wide variation by appropriate selection of the  
numbers and spacings of the internal panels 5 and 6  
10 employed in any instance.

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CLAIMS

1. A kit of parts adapted to be assembled into a rectangular array of lockers, comprising: separate  
5 panels adapted to form respectively the two sides, top, bottom and back of a rectangular carcass; at least one internal panel adapted to extend vertically from top to bottom of the carcass to divide the interior thereof into columns; at least one internal panel adapted to extend  
10 horizontally from side to side of the carcass to divide the interior thereof into rows; and a plurality of doors, one for each locker; said internal vertical and horizontal panels being slit so as to interfit orthogonally with one another; and respective said  
15 panels being configured such that in the assembled condition said internal panels can be fastened to said top and/or bottom and/or back and/or side panels, said top and/or bottom panels can be fastened to said side and/or back panels, and/or said back panel can be  
20 fastened to said side panels, by means of a plurality of tangs on one such panel passing through respective slots in the other such panel and being treated to prevent return passage of said tangs through said slots.
- 25 2. A kit according to claim 1 wherein said tangs are adapted to be plastically deformed to prevent return passage through said slots.
- 30 3. A kit according to claim 2 wherein said tangs are adapted to be twisted to prevent return passage through said slots.
- 35 4. A kit according to any preceding claim comprising a plurality of reinforcing strips adapted to be attached along respective front vertical edges of said internal vertical and side panels, said top, bottom and internal horizontal panels being apertured to pass said strips.





5. A kit according to any preceding claim wherein said doors are adapted to be assembled to said carcass by snap-fitting hinge means.

5 6. A kit according to claim 5 wherein said hinge means are configured to permit assembly and disassembly of said doors to and from said carcass only in an open orientation of the respective door.

10 7. A kit according to claim 5 or claim 6 comprising a plurality of profile strips adapted to be attached to the front vertical edges of said vertical internal panel(s) and of at least one said side panel, each said profile strip defining a first partial journal bearing surface;  
15 each said door having a second partial journal bearing surface; one of said first and second partial journal bearing surfaces being a male surface while the other such surface is a female surface, and at least said female surface is moulded in plastics material.

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8. A kit of parts according to claim 1 and substantially as hereinbefore described with reference to the accompanying drawings.

25 9. A method of assembling a kit of parts according to any preceding claim into a rectangular array of lockers, which comprises the steps of (i) interfitting said internal vertical and horizontal panels; (ii) assembling said internal panels with said side, top, bottom and back  
30 panels to form said carcass; and (iii) fitting said doors to said carcass; wherein step (ii) comprises fastening respective said panels together by passing a plurality of said tangs on one such panel through respective slots in another such panel and treating those  
35 tangs to prevent their return passage through said slots.

10. A method according to claim 9 wherein step (ii) comprises the successive steps of: fastening said back panel to the assembly of said internal panels by means of





tangs on said internal panels passing through slots in  
said back panel; fastening said top and bottom panels  
respectively to the assembly of said internal and back  
panels by means of tangs on said internal vertical and  
5 back panels passing through slots in said top and bottom  
panels respectively; and fastening said side panels  
respectively to the assembly of said internal, back, top  
and bottom panels by means of tangs on said back, top and  
bottom panels passing through slots in said side panels  
10 respectively.

11. An array of lockers assembled from a kit of parts  
according to any one of claims 1 to 8.

15 12. An array of lockers assembled by a method according  
to claim 9 or claim 10.

