A tray for holding handheld devices, such as cell phones, PDAs, GPS devices, and the like is disclosed. The tray has recesses for holding handheld devices, including disclosing nested recesses for holding devices of various shapes and sizes. Indicia such as color banding at one end, is disclosed to facilitate processing of the trays in a packaging process.
**Fig. 2C**

**Fig. 2D**
Fig. 2E
Fig. 3A

Fig. 3B
Fig. 3C

Fig. 3D
Fig. 4C

Fig. 4D
TRAY FOR HANDHELD ELECTRONIC DEVICES

[0001] The present invention relates to a tray for electronic devices, such as mobile telephones. More particularly, such tray is useful to improve the flow of programming, sorting and/or packaging such handsets for distribution to the end user.

BACKGROUND

[0002] Mobile communication devices, such as mobile telephones, PDAs, GPS units and the like are sold by the millions. After the handsets are manufactured, they must be packaged for resale and distribution.

[0003] The present invention provides a tray useful in assembling the handset with other materials (e.g., instruction booklets) for final packaging. The tray is particularly useful if optionally used in connection with the robotic packaging system, allowing the handsets to be staged for later grabbing by robotic arm in such packaging. Alternatively, the trays may be used to facilitate manual packaging or other functions as well.

SUMMARY

[0004] The present invention provides an improved tray for holding handsets, such as mobile phones, PDAs, GPS devices and the like. Typically, the tray holds the handsets in a series of columns and rows in a generally rectangular configuration. This may be varied according to need. Also, optionally the present invention provides an indicator at the front of the tray, by markings, color coding or otherwise, to facilitate feeding the trays into an assembly process. Also optionally, the trays may include nesting which allows the trays to accommodate two or more different sizes and/or shapes and handle devices. The trays, and only the trays, define the invention.

[0005] One object of the present invention is to provide a device to hold handheld devices. Another object of the present invention is to further facilitate packaging of handheld devices.

DESCRIPTION OF THE DRAWING FIGURES

[0006] FIG. 1A is a top perspective view of one embodiment;
[0007] FIG. 1B is a top plane view of the device of FIG. 1A;
[0008] FIG. 1C is a side cross-sectional view cut through a typical row of the device of FIG. 1A;
[0009] FIG. 1D is a side cross-sectional view cut through a typical column of the device of FIG. 1A;
[0010] FIG. 1E is a magnified top perspective view, partially cut away of the device of FIG. 1A;
[0011] FIG. 1F is a magnified cross-sectional view taken through a column of the device of FIG. 1A;
[0012] FIG. 1G is a magnified cross-sectional view taken through a row of the device of FIG. 1A;
[0013] FIG. 2A is a top perspective view of one embodiment;
[0014] FIG. 2B is a top plane view of the device of FIG. 2A;
[0015] FIG. 2C is a side cross-sectional view cut through a typical row of the device of FIG. 2A;
[0016] FIG. 2D is a side cross-sectional view cut through a typical column of the device of FIG. 2A;
[0017] FIG. 2E is a magnified top perspective view, partially cut away of the device of FIG. 2A;
[0018] FIG. 2F is a magnified cross-sectional view taken through a column of the device of FIG. 2A;
[0019] FIG. 2G is a magnified cross-sectional view taken through a row of the device of FIG. 2A;
[0020] FIG. 3A is a top perspective view of one embodiment;
[0021] FIG. 3B is a top plane view of the device of FIG. 3A;
[0022] FIG. 3C is a side cross-sectional view cut through a typical row of the device of FIG. 3A;
[0023] FIG. 3D is a side cross-sectional view cut through a typical column of the device of FIG. 3A;
[0024] FIG. 3E is a magnified top perspective view, partially cut away of the device of FIG. 3A;
[0025] FIG. 3F is a magnified cross-sectional view taken through a column of the device of FIG. 3A;
[0026] FIG. 3G is a magnified cross-sectional view taken through a row of the device of FIG. 3A;
[0027] FIG. 4A is a top perspective view of one embodiment;
[0028] FIG. 4B is a top plane view of the device of FIG. 4A;
[0029] FIG. 4C is a side cross-sectional view cut through a typical row of the device of FIG. 4A;
[0030] FIG. 4D is a side cross-sectional view cut through a typical column of the device of FIG. 4A;
[0031] FIG. 4E is a magnified top perspective view, partially cut away of the device of FIG. 4A;
[0032] FIG. 4F is a magnified cross-sectional view taken through a column of the device of FIG. 4A;
[0033] FIG. 4G is a magnified cross-sectional view taken through a row of the device of FIG. 4A;

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

[0034] For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated herein and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Any alterations and further modifications in the described processes, systems or devices, any further applications of the principles of the invention as described herein, are contemplated as would normally occur to one skilled in the art to which the invention relates.

[0035] As used in the claims and the specification, the following terms have the following definitions:

[0036] The term “handheld electronic devices” means an electronic device such as a mobile phone (cellular or otherwise), PDA, global positioning satellite unit, mp3 or other music or video players, and/or any combination of the foregoing alone or with other features that is electronic, and may be handheld, namely conveniently held in a single adult hand. These devices typically, but not necessarily, are battery powered, but also could include a solar powered hand held devices.

[0037] The term “raised portions” is a relative term, meaning raised in a vertical (Z axis) direction as compared “lowered recesses” defined below.

[0038] The term “lowered recesses” is relative, being lower in a vertical (Z axis) direction as compared to the “raised portions” defined above.

[0039] The term “column” means a generally linear alignment of two or more items.

[0040] The term “row” means alignment of articles that is generally perpendicular to the “column” defined above. Ordi-
narily, but not necessarily, a row is perpendicular to a column. However, as used herein the row could be curvilinear and/or circular, with a column extending radially.

[0041] The term “closely hold” means to substantially contour the shape of an outer profile of an item so as to restrain it from substantial movement or rattling.

[0042] The term “edge” can include a variety of geometric, including straight, curved, saw tooth, jagged, or otherwise, and may be a free edge, or formed by a fold, bulge or otherwise. Generally, it is the outermost portion of the tray, at least in a particular locality.

[0043] The term “visual indicia” includes human readable and/or machine readable (whether or not human readable) indicators on or connected to the tray. These can include differences in color, marking, shaped object, barcodes, arrows, embossments, and shapes. Such indicia allow ready identification of one edge from another.

[0044] The term “nested” means one item at least partially within another. For example, an item, such as a recess, may be nested partially or wholly when viewed at a top plane view such that it is partially or wholly surrounded by the larger, outer object. Similarly, nested can contemplate a vertical nesting, in the Z axis direction, wholly or partially. In such situation, the smaller of the two items typically is nested lower than the larger of the two items. Nesting can include a combination of vertical and/or horizontal nesting.

[0045] The term “lower and upper part of a flip-phone” includes two separate portions of a cellular or other phone or device. Typically, the upper part includes the ear-piece and the lower part includes the mouth piece of the phone, interconnected by a hinge. However, in this context, “flip-phone” also includes where the two parts slide, pivot, or otherwise move with respect to each other.

[0046] The term “top surface” includes generally the upward facing surface of a tray, regardless of its topography.

[0047] The term “bottom surfaces” means generally the downward facing surface of a tray, regardless of its topography.

[0048] The term “tray” means a device for holding multiple items; it is generally, at a gross level, flat, although it may have varying topography such as for example raised and lowered portions. It may be solid, porous, screen, sheet, mesh, connected elements, or otherwise. It may be made of plastic, metal, composite or any material.

[0049] Generally, a first example is shown in FIGS. 1A-1G with various numbers beginning with the “100” prefix; a second example is shown in FIGS. 2A-2G with the “200” series; a third example is shown in FIGS. 3A-3G using the “300” series; and, a fourth example is shown in FIGS. 4A-4G using the “400” series. In general, apart from the hundredth digit (1, 2, 3, 4), the corresponding reference characters in the four given examples generally correspond to each other. For example, edge 133 corresponds to edge 233 corresponds to edge 333 corresponds to edge 433, and so forth. Differences may be seen by comparing the drawing figures. These drawing figures are merely examples, and other versions are possible as well. As such, portions of this written description are written in parallel, referring to multiple analogous reference numbers for the sake of brevity.

[0050] Referring to the drawing figures, they illustrate a device for holding several handheld electronic devices, 101, 111; 201, 211; 301, 401. It includes, but is not limited to (comprising) a tray 100; 200; 300; 400 that has raised portions as shown in the drawings. Such raised portions include, but are not limited to, raised portions 103, 113 and 123; 203, 213, 223. The tray may also have lowered recesses, including without limitation like recesses 120; 220; 320; 420. Preferably, the lowered recesses are lower relative to the raised portions. Preferably, the recesses are arranged in more than one column, such as Column C; C2; C3; C4, and more than one row, such as Row R; R2; R3; R4. The tray may have one or more edges. For example, the front edge 131, 231, 331; 441 is provided. Also, optionally there is a rear edge 132; 232; 332; 432 which preferably is opposite the front edge. Between them are optional side edges 133; 233, 333; 433 and 134; 234; 334, 434 as shown in the drawings.

[0051] Preferably, but optionally, the recesses, such as recess 120; 220; 320; 420 are individually shaped to closely hold one handheld device each.

[0052] Preferably, but optionally, the tray has a front edge, such as edge 131 and the columns, such as column C, are oriented to point the handheld devices, such as device 101 and 111, in the same direction of each other, vis-a-vis the front edge.

[0053] Preferably, but optionally, the tray further has visual indicia which readily distinguishes the front edge from the back edge to facilitate placement of the tray with the front edge properly in a front orientation. Such visual indicia are as previously defined. For example, and only by way of example, FIG. 1A shows that the first row R is tinted at 140 a different color from the remainder of the tray. Similarly, such indicia another form of tinting 240 is shown in FIG. 2A for row R2. As yet another optional example of indicia, arrows, such arrows 341a illustrated in FIGS. 3A and 3B which may be used instead of or in addition to other indicia. Such arrows point towards front edge 331. These arrows are merely one example of a shape, coloration, embossment or otherwise which may be used, and is no way limiting.

[0054] Optionally, a recess of the type like recess 120 may include both a primary recess and a secondary recess nested at least partially within and at least partially below the primary recess. Examples of this are illustrated in FIGS. 1A-1G and FIGS. 2A-2G. In this way, the secondary recess 120a; 220b may optionally closely hold a first (typically smaller) phone such as 101 (FIG. 1E) or phone 201 FIG. 2E as compared to the phone in the primary recess 120a; 220b (typically larger) such as phone 111 (FIG. 1F) or phone 211 (FIG. 2F). The primary recess is preferably shaped to hold a first size handheld electronic device, and the secondary recess is preferably shaped to alternatively hold a second size handheld electronic device smaller than the first size device. Optionally, triple, quadruple or more recess nesting may be provided.

[0055] Preferably, but optionally, vertical recesses 150; 250; 350; 450 (see FIGS. 1E; 2E; 3E; 4E) may be provided. Such vertical recesses typically are provided along the perimeter side edges of the tray. Preferably, they are sized and shaped to facilitate an adult finger or robot element to facilitate grasping of the device held in the tray.

[0056] Similarly, and preferably, but optionally, recesses 151; 251; 351; 451 (see FIGS. 1E; 2E; 3E; 4E) may be provided. Typically, such recesses when provided are in between adjacent primary recesses and/or in between adjacent secondary recesses. Such recesses, openings, or passages 151; 251; 351; 451 facilitate grasping (robotic or otherwise) of a device closely held in the primary recess and/or secondary recess.

[0057] Optionally, a bottom floor 105; 205; 305; 405 may be formed in the tray’s recesses (either the primary recess or...
a secondary recess). Preferably, but not necessarily, such floor is in contact with the device being held. However, optionally, other portions that are raised relative to the floor may suspend the device over, not in contact, with the floor.

Another optional attribute of the recesses, including some or all of the recesses, is that they may be arranged to accommodate a flip phone. For example, FIGS. 3A-3G show recesses, such as recess 320 to accommodate a flip phone such as flip phone 301. Preferably, such flip phone includes a lower part 301A and an upper part 301B which are connected together by a hinge or other such pivoting mechanism. Preferably, the tray is arranged to accommodate such upper and lower part of the flip phone in an open position, as illustrated (see FIG. 3E), to expose a back side, including a back side SIM card receptacle 301C in the phone. A SIM card receptacle is a slot or other receptacle in the phone or electronic device to receive a SIM (Subscriber Identity Module). Optionally, one or more transverse recesses 306 may be provided to receive a flip-phone hinge therein (see FIG. 3F). Optionally, one or more parallel longitudinal raised portions 304; 404 may be provided. For example, surfaces 304 straddle edge 305 and contact and support a keypad of phone 301.

As illustrated in each of the four examples, the tray is preferably rectilinear. In such case, the rows correspond to an X-axis direction and the columns correspond to a Y-axis direction. Optionally, however, it may take other shapes. This could include a circular arrangement with radial columns and circumferential rows. In such case, there would preferably be a single, outer edge. Other options could include sector or pie shaped trays, and, while rectilinear trays are preferred, they are not required.

Such trays preferably, but optionally, are formed by molding. Preferably, they are molded by vacuum molding of one or more flat sheets of plastic. This may optionally include forming a unitary piece of plastic by fusing or otherwise pigmenting one portion to another, such as to form the tinting 140 which forms the indicia as previously described. Such indicia also can be done by chemical alteration, painting, printing, or otherwise.

Preferably, but optionally, the trays have a general top surface 160; 260; 360; 460 and opposite bottom surface 170; 270; 370; 470 (see FIGS. 1A; 2A; 3A; 4A). Preferably, the top surfaces and the bottom surfaces are substantially the same (typically substantially the same in shape, arrangement and topography) whereby like trays are stackable in close vertical proximity when not holding a handheld device. This is preferably accomplished by molding the trays from thin sheets of plastic or other material (preferably, but not necessarily, less than about one millimeter in material thickness). Also, this is facilitated by having surfaces which are either horizontal, vertical, or slightly upwardly flared in angle (as opposed to slightly downwardly flared in angle), thereby facilitating contoured fit of the lower surface of one tray into and against the corresponding upward surface of another tray. In this way, the trays may be conveniently stacked with this optional attribute.

The present invention contemplates modifications as would occur to those skilled in the art. It is also contemplated that processes embodied in the present invention can be altered, rearranged, substituted, deleted, duplicated, combined, or added to other processes as would occur to those skilled in the art without departing from the spirit of the present invention. In addition, the various stages, steps, procedures, techniques, phases, and operations within these processes may be altered, rearranged, substituted, deleted, duplicated, or combined as would occur to those skilled in the art.

We claim:

1. A device for holding several handheld electronic devices, such as mobile phones, PDA's, GPS units, comprising:
   a tray that has raised portions and lowered recesses relative thereto, said recesses being arranged in more than one column and more than one row;
   said recesses individually being shaped to closely hold one handheld electronic device;
   said tray having a front edge, and said recesses in said columns being oriented to point the handheld devices in the same direction vis-à-vis said front edge;
   said tray having a back edge which is opposite of said front edge;
   said tray further having visual indicia which readily distinguishes said front edge from said back edge to facilitate placement of said tray with said front edge properly in a front orientation.

2. The device of claim 1 wherein said recesses include both a primary recess and a secondary recess nested at least partially within and at least partially below said primary recess, said primary recess being shaped to hold a first sized handheld electronic device, and said secondary recess being shaped to alternatively hold a second sized handheld electronic device smaller than said first sized device.

3. The device of claim 2 wherein said recesses are shaped to accommodate both a lower and upper part of a flip-phone in an open position and inverted to expose a back side SIM card receptacle in said phone.

4. The device of claim 3 wherein said tray is rectilinear and is formed by molding at least one flat sheet of plastic into a unitary piece having said raised portions and lowered recesses.

5. The device of claim 4 wherein said tray has tops surface and an opposite bottom surfaces, wherein said top surfaces and bottom surfaces are substantially the same and wherein like trays are stackable in close vertical proximity when not holding a handheld device.

6. The device of claim 5 wherein said tray is formed by molding together two different sheets of flat plastic having colors different from each other, said different colors providing said visual indicia which readily distinguishes said front edge from said back edge.

7. The device of claim 1 wherein said recesses are shaped to accommodate both a lower and upper part of a flip-phone in an open position and inverted to expose a back side SIM card receptacle in said phone.

8. The device of claim 7 wherein said tray is rectilinear and is formed by molding at least one flat sheet of plastic into a unitary piece having said raised portions and lowered recesses.

9. The device of claim 7 wherein said tray has tops surface and an opposite bottom surfaces, wherein said top surfaces and bottom surfaces are substantially the same and wherein like trays are stackable in close vertical proximity when not holding a handheld device.

10. The device of claim 7 wherein said tray is formed by molding together two different sheets of flat plastic having colors different from each other, said different colors providing said visual indicia which readily distinguishes said front edge from said back edge.
11. A device for holding several handheld electronic devices, such as mobile phones, PDA's, GPS units, comprising:
a tray that has raised portions and lowered recesses relative thereto, said recesses being arranged in more than one column and more than one row;
wherein said recesses include both a primary recess and a secondary recess nested at least partially within and at least partially below said primary recess, said primary recess being shaped to hold a first sized handheld electronic device, and said secondary recess being shaped to alternatively hold a second sized handheld electronic device smaller than said first sized device.

12. The device of claim 11 wherein said recesses are shaped to accommodate both a lower and upper part of a flip-phone in an open position and inverted to expose a back side SIM card receptacle in said phone.

13. The device of claim 11 wherein said tray is rectilinear and is formed by molding at least one flat sheet of plastic into a unitary piece having said raised portions and lowered recesses.

14. The device of claim 11 wherein said tray has tops surface and an opposite bottom surfaces, wherein said top surfaces and bottom surfaces are substantially the same and wherein like trays are stackable in close vertical proximity when not holding a handheld device.

15. The device of claim 11 wherein said tray is formed by molding together two different sheets of flat plastic having colors different from each other, said different colors providing visual indicia which readily distinguishes a front edge from an opposite back edge.

16. A device for holding several handheld electronic devices, comprising:
a tray that has raised portions and lowered recesses relative thereto, said recesses being arranged in more than one column and more than one row;
wherein said recesses are shaped to closely hold both a lower and upper part of a flip-phone in an open position and inverted to expose a back side SIM card receptacle in said phone.

17. The device of claim 16 wherein said tray has visual indicia which readily distinguishes a front edge from a back edge to facilitate placement of said tray with said front edge properly in a front orientation.

18. The device of claim 17 wherein said tray is formed by molding together two different sheets of flat plastic having colors different from each other, said different colors providing said visual indicia which readily distinguishes said front edge from said back edge.

19. The device of claim 16 wherein said tray has tops surface and an opposite bottom surfaces, wherein said top surfaces and bottom surfaces are substantially the same and wherein like trays are stackable in close vertical proximity when not holding a handheld device.

20. The device of claim 17 wherein said tray has tops surface and an opposite bottom surfaces, wherein said top surfaces and bottom surfaces are substantially the same and wherein like trays are stackable in close vertical proximity when not holding a handheld device.

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