Abstract

A tray unit includes a main body including at least one storage space and a wall structure surrounding the at least one storage space. The wall structure includes a bottom wall and a sidewall surrounding the bottom wall to define the at least one storage space. The tray unit further includes a magnet arranged with the wall structure at a location along a perimeter of the main body.
Fig. 2B
Fig. 2E
Fig. 3C

Fig. 3D
Fig. 5
DRAWER STORAGE WITH MAGNETIC CONNECTORS

CROSS REFERENCE TO PRIOR APPLICATIONS

[0001] This application claims priority and benefit thereof from U.S. Provisional Application No. 61/262,962 filed on Nov. 20, 2009, entitled MAGNETIC DRAWER STORAGE, which is hereby incorporated herein by reference for all purposes as if fully set forth herein.

BACKGROUND OF THE DISCLOSURE

[0002] 1. Field of the Disclosure
[0003] This disclosure is directed to a storage unit, and more particularly to a drawer storage unit with magnetic connectors for customized storage arrangements.
[0004] 2. Related Art
[0005] Various drawer storage units are currently available on the market. These storage units are typically fixed in shape, size and configuration, with little or no feasible way to customize the storage units to accommodate every user's needs, including the different sizes and configurations of various kitchen drawers. Typically, it is not possible to change the number, location, arrangement and size of the storage compartments of these drawer storage units, and a user are limited to the fixed arrangement. Furthermore, the users are left with little alternative but to search for storage units that will not fit perfectly in the kitchen drawer(s). Once placed in the kitchen drawers, these drawer storage units may move back and forth in the kitchen drawers every time the drawers are opened or closed, thereby causing damage to the drawers. Additionally, as the drawers are opened or closed, contents in the drawers may shift, causing the contents to be damaged, such as, for example, silverware that becomes scratched due to the shifting in the drawers.
[0006] Some prior art approaches have contemplated using mechanical fasteners to couple several storage devices together in order to achieve customization. However, these approaches are difficult to use as the use of mechanical fasteners takes time to mechanically connect the storage devices together. Additionally, the mechanically connected storage devices are difficult to insert in a drawer and/or result in wasted space as the mechanically fastened storage tray has to be sized to be inserted in a drawer and accordingly cannot completely fill drawer space. That is there needs to be some unused drawer space to insert the storage devices into the drawer resulting in wasted space.
[0007] Accordingly, there is a need for a drawer storage that is easily customizable to different shapes and sizes.

SUMMARY OF THE DISCLOSURE

[0008] According to an aspect of the disclosure, a tray unit includes a main body that includes at least one storage space and a wall structure surrounding the at least one storage space, the wall structure including a bottom wall and a side wall surrounding the bottom wall to define the at least one storage space, and a magnet arranged with the wall structure at a location along a perimeter of the main body.
[0009] The tray unit may further include a plurality of storage spaces separated from each other by the wall structure. The magnet may include the first magnet arranged with the first side of the main body, and the second magnet arranged with the second side of the main body opposite to the first side. The magnet may include the first surface having the first polarity and the second surface having the second polarity. The magnet may be removable and reinsertable to allow one of the first and second surfaces thereof to face outwardly from the perimeter of the main body.
[0010] The wall structure may include a recess configured to receive and hold the magnet at the location along the perimeter of the main body. The recess may be configured to receive and hold the magnet so that the magnet does not protrude outwardly from the perimeter of the main body.
[0011] The tray unit may further include a magnet cover configured to engage the main body to cover the magnet.
[0012] The magnet cover may include a marking for indicating a polarity. The magnet cover may include a magnet cap. The main body may further include a strip formed around the perimeter thereof and having an opening exposing the recess. The magnet cap may be inserted into the opening of the strip to cover the magnet.
[0013] The magnet cover may include a strip formed around the perimeter of the main body to cover the magnet. The strip may include a covering portion located correspondingly to the magnet. The strip may be removable.
[0014] The tray unit may further include a protective cover configured to cover an upper surface of the bottom wall. The protective cover may include a protrusion formed on a bottom surface thereof to engage a recess formed correspondingly thereto on an upper surface of the bottom wall.
[0015] A drawer storage assembly may include the tray unit. The tray unit may be the first tray unit, and the drawer storage assembly may further include the second tray unit magnetically attached to the first tray unit. The second tray unit may include a main body including at least one storage space and a wall structure surrounding the at least one storage space, the wall structure of the second tray unit including a bottom wall and a side wall surrounding the bottom wall to define the at least one storage space, and a magnet arranged with the wall structure of the second tray unit at a location along a perimeter of the main body of the second tray unit. A number of the storage spaces of the first tray unit may be different from that of the second tray unit.
[0016] Additional features, advantages, and embodiments of the disclosure may be set forth or apparent from consideration of the following detailed description, drawings, and claims. Moreover, it is to be understood that both the foregoing summary of the disclosure and the following detailed description are exemplary and intended to provide further explanation without limiting the scope of the disclosure as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The accompanying drawings, which are included to provide a further understanding of the disclosure, are incorporated in and constitute a part of this specification, illustrate embodiments of the disclosure and together with the detailed description serve to explain the principles of the disclosure. No attempt is made to show structural details of the disclosure in more detail than may be necessary for a fundamental understanding of the disclosure and the various ways in which it may be practiced. In the drawings:
[0018] FIG. 1 shows a perspective view of a drawer storage assembly formed by magnetically connecting a plurality of tray units, constructed according to the principles of the disclosure;
FIG. 2A shows a perspective view of a main body of one of the tray units shown in FIG. 1, constructed according to the principles of the disclosure;

FIG. 2B shows a bottom view of the main body shown in FIG. 2A;

FIG. 2C shows a side view of the main body shown in FIG. 2A;

FIG. 2D shows a side view of the main body shown in FIG. 2A with a strip attached thereto constructed according to the principles of the disclosure;

FIG. 2E shows a top view of the main body shown in FIG. 2A;

FIG. 2F shows a top view of the main body shown in FIG. 2A with a plurality of protective covers constructed according to the principles of the disclosure;

FIG. 3A shows a side view of the strip for the main body shown in FIG. 2D, constructed according to the principles of the disclosure;

FIG. 3B shows an opposite side view of the strip shown in FIG. 3A;

FIG. 3C shows a perspective view of another strip for the main body shown in FIG. 2A, constructed according to the principles of the disclosure;

FIG. 3D shows perspective views of magnet caps, constructed according to the principles of the disclosure;

FIG. 4A shows a top view of one of the protective covers shown in FIGS. 1 and 2F;

FIG. 4B shows a side view of the protective cover shown in FIG. 4A;

FIG. 4C shows a bottom view of one of the protective covers shown in FIG. 4A; and

FIGS. 5, 6, 7 and 8 show perspective views of main bodies of other tray units shown in FIG. 1, constructed according to the principles of the disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

The embodiments of the disclosure and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments and examples that are described and/or illustrated in the accompanying drawings and detailed in the following description. It should be noted that the features illustrated in the drawings are not necessarily drawn to scale, and features of one embodiment may be employed with other embodiments as the skilled artisan would recognize, even if not explicitly stated herein. Descriptions of well-known components and processing techniques may be omitted so as to not unnecessarily obscure the embodiments of the disclosure. The examples used herein are intended merely to facilitate an understanding of ways in which the disclosure may be practiced and to further enable those of skill in the art to practice the embodiments of the disclosure. Accordingly, the examples and embodiments herein should not be construed as limiting the scope of the disclosure, which is defined solely by the appended claims and applicable law. Moreover, it is noted that like reference numerals represent similar parts throughout the several views of the drawings.

FIG. 1 shows a perspective view of a drawer storage assembly 10 formed by magnetically connecting a plurality of tray units 100, e.g., tray units 100A, 100B, 100C, 100D (two shown), 100E and/or the like, constructed according to the principles of the disclosure. Each of the tray units 100A, 100B, 100C, 100D, 100E may include one or more magnets 300 (shown in FIG. 2A in detail) arranged in, along and/or on a perimeter thereof such that the tray units 100A, 100B, 100C, 100D, 100E may be easily connected and disconnected to each other, or other tray units. Since the tray units 100 may be easily connected and disconnected within a drawer, the drawer storage assembly 10 may be easily installed within the drawer while minimizing loss of the drawer space. The tray unit 100 may be configured such that the magnets 300 may not be removable therefrom. Alternatively or additionally, the tray unit 100 may be configured such that a user may remove the magnets 300 therefrom (shown in FIG. 2A), flip the magnets 300 to change the polarities of the magnets 300 and reattach the magnets 300 to the tray unit 100. The magnets 300 may be coin or button-shaped (shown in FIG. 2A) and have a first side having a first polarity, e.g., a “+” polarity, and a second side having a second polarity, e.g., a “−” polarity.

The magnets 300 may be arranged with a main body 102A (shown in FIG. 2A) of the tray unit 100 and/or other portions of the tray unit 100, such as, e.g., a strip 200 and/or the like. Alternatively, the magnets 300 may be arranged between the main body 102A and the strip 200. The strip 200, such as, e.g., strips 200A, 200B, 200C, 200D, 200E, may substantially extend along a perimeter of the tray unit 100. In some aspects, the strip 200 may be used to cover and/or fix the magnets 300 on the perimeter of the tray unit 100 (shown in FIG. 2D). Alternatively or additionally, the strip 200 may be configured to receive the magnets 300 (shown in FIG. 3C). The strip 200 may be removable from the tray unit 100. Alternatively, the strip 200 may be integral or fixed to the tray unit 100 and, hence, may not be removed from the tray unit 100. The drawer storage assembly 10 may further include one or more protective covers 400 to protect contents thereof, e.g., silverware and/or the like, from being scratched or damaged.

The tray unit 100A may include a main body 102A (shown in FIG. 2A), the strip 200A and one or more magnets 300. FIG. 2A shows a perspective view of the main body 102A, constructed according to the principles of the disclosure. The main body 102A may include one or more storage spaces 110 separated from each other by a wall structure including one or more bottom walls 120 and sidewalls 130. Each of the sidewalls 130 may extend upwardly from and surround each bottom wall 120 to define the storage space 110. Although FIG. 2A shows the main body 102A as having five storage spaces, the number of storage spaces for the tray units 100A, 100B, 100C, 100D, 100E may be more or less than five. For example, FIGS. 5, 6, 7 and 8 show perspective views of main bodies 102B, 102C, 102D, 102E of the tray units 100B, 100C, 100D, 100E, respectively, each having a single storage space.

Referring back to FIG. 2A, the main body 102A in some aspects may include one or more recesses 150 to receive the magnets 300, respectively. For example, one or more recesses 150, such as, e.g., recesses 150A, 150B, may be formed at one side of the main body 102A. Another set of recesses 150, such as, e.g., recesses 150C, 150D, may be formed at the opposite side of the main body 102A. The number and locations of the recesses 150 (and the magnets 300) may vary depending on the size and shape of each tray unit 100, a magnetic force strength of the magnets 300 and/or the like. For example, in FIG. 1, the tray unit 100C, which is about twice as long as the tray units 100D, 100E, may have two magnets 300 on one side while the tray units 100D, 100E may have one magnet 300 on one side thereof such that the tray units 100D, 100E may be simultaneously connected to
the one side of the tray unit 100C. The recesses 150 may be formed in different locations. For example, the main body 102A may have one or more recesses 150 on each of its sides such that one or more other tray units 100 may be connected to any side of the main body 102A with one or more magnets 300 in the recesses 150 of the desired side of the body portion 102A. The shape and size of each recess 150 may vary depending on the shape and size of the magnets 300. For example, for the coin or button-shaped magnet 300, the recess 150 may also be coin or button-shaped. The recess 150 may be slightly larger than the magnet 300 such that the user may easily remove the magnet 300 therefrom.

In some aspects, a strip 200A may be formed around the perimeter of the main body 102A. The strip 200A may be removably attached to the main body 102A. Alternatively, the strip 200A may be integral or fixed (e.g., overmolded) to the main body 102A with or without the magnet 300 therebetween. The strip 200A may reinforce a structural rigidity of the main body 102A. For example, the strip 200A may be formed of thermoelastomer (TPE) and/or other materials to provide stiffness and abrasion-resistance. The strip 200A may be configured to provide a place to hold the magnets 300 such that the storage spaces 110 are not sacrificed to make a space for the magnets 300 in the wall structure. Also, the strip 200A may be configured not to protrude outwardly from the perimeter of the tray unit 100A such that no space is wasted between two tray units 100 when they are connected to each other. Thus, it may be possible to minimize a space wasted for establishing connection among the tray units 100 and maximize a storage capacity of the drawer storage assembly 10. Furthermore, the removable strip 200A may be used as a magnet cover, which is explained below in detail in FIGS. 3A and 3B.

When a removable strip 200 is used, the main body 102A may further include an attachment structure 140 formed around the perimeter of the main body 102A to receive and/or engage the strip 200A. In the particular embodiment shown in FIG. 2A, the attachment structure 140 may have a rectangular shape with four straight portions 140A, 140B, 140C, 140D. The shape, size, texture, composition, and the like of the strip 200A and the attachment structure 140 may vary depending on the configuration of the tray unit 100. For example, a removable tray unit 100 having a circular perimeter shape may have a circular-shaped strip 200 and the same circular-shaped attachment structure 140. The attachment structure 140 may be connected to the recesses 150A, 150B, 150C, 150D. For example, as seen in FIG. 2A, the recesses 150A, 150B may be connected to the portion 140A of the attachment structure 140, and the recesses 150C, 150D may be connected to the portion 140B arranged opposite to the portion 140A.

FIG. 3A shows a side view of the strip 200A shown in FIG. 2D, and FIG. 3B shows the opposite side view of the strip 200A shown in FIG. 3A. Referring to FIGS. 3A and 3B concurrently, the strip 200A may have enlarged portions 210A, 210B, 210C, 210D to cover and fix the magnets 300A, 300B, 300C, 300D, respectively, on the main body 102A. Additionally, the enlarged portions 210A, 210B, 210C, 210D may include markings 220A, 220B, 220C, 220D, respectively, such as, e.g., “+” or “−”. Each of the markings 220A, 220B, 220C, 220D may indicate a polarity of the magnet 300 covered thereby such that the user may easily identify the polarities of the magnets 300 covered by the enlarged portions 210A, 210B, 210C, 210D, as shown in FIG. 2D. Further the markings 220A, 220B, 220C, 220D may be used to guide the user to correctly set the polarities of the magnets 300 in arranging or rearranging the tray units 100.

FIG. 3C shows a perspective view of another strip 200A’, constructed according to the principles of the disclosure. Similar to the strip 200A shown in FIGS. 3A, 3B, the strip 200A’ may be removably attached to the main body 102A, or, alternatively, integral or fixed (e.g., overmolded) to the main body 102A. However, the strip 200A’ may include one or more openings 250, such as, e.g., openings 250A, 250B, 250C, 250D. The openings 250 may be located corresponding to the recesses 150, respectively. For example, when the strip 200A’ is combined with the main body 102A, the openings 250A, 250B, 250C, 250D may be aligned to the recesses 150A, 150B, 150C, 150D of the main body 102A, respectively. In the case the strip 200A’ is integral or fixed to the main body 102A, the recess 150 of the main body 102A may extend inwardly from the opening 250 of the strip 200A’.

FIG. 3D shows perspective views of magnet caps 230A, 230B, constructed according to the principles of the disclosure. In some aspects, the magnet caps 230A, 230B may be configured to fit into the openings 250 of the strip 200A’ to contain the magnets 300 in the recesses 150. Alternatively, the magnet caps 230A, 230B may be molded into the strip 200A or into the wall structure of the main body 102A. Further, the strip 200A’, the magnets 300 and the magnet caps 230A, 230B may be configured such that once the magnet caps 230A, 230B are inserted into the openings 250 or overmolded to the wall structure of the main body 102A, the magnet caps 230A, 230B may not protrude from the perimeter of the main body 102A. The magnet caps 230A, 230B may include a marking, such as, e.g., “+” or “−” to indicate a polarity. FIG. 3D particularly shows the magnet cap 230A having a “+” marking 232 and the magnet cap 230B having a “−” marking 234. Other types of marking are also contemplated, such as, e.g., letters, numbers, symbols and/or the like.

FIG. 2B shows a bottom view of the main body 102A. FIG. 2C shows a side view of the main body 102A and FIG. 2E shows a top view of the main body 102A. Referring to FIGS. 2B, 2C and 2E concurrently, the recesses 150A, 150B may be connected to the portion 140A of the attachment structure 140, and the recesses 150C, 150D may be connected to the portion 140B arranged opposite to the portion 140A. The main body 102A may further include a plurality of legs 170 protruding downwardly from the bottom walls 120, as shown in FIGS. 2B and 2C. The legs 170 may prevent a drawer surface from being scratched and/or damaged by the drawer storage assembly 10. The legs 170 may also provide a high degree of static friction to minimize movement of the tray units 100 in a drawer (not shown). The legs 170 may be formed integrally with the bottom walls 120 or affixed to the bottom walls 120. For example, the legs 170 may be comolded with the wall structure of the tray unit 102A as one piece.

In an embodiment, a bottom surface of each bottom wall 120 may include at least one leg 170, which may coincide with at least one recess 160 formed on a top surface of the bottom wall 120 as shown in FIG. 2E. Alternatively, the legs 170 and the recesses 160 may not coincide with respect to the bottom wall 120.

FIG. 2F shows a top view of the main body 102A with a plurality of protective covers 400. As noted above, each storage space 110 may have the protective cover 400 arranged on the upper surface of the bottom wall 120 thereof.
4A, 4B and 4C show top, side and bottom views of the protective cover 400, respectively. Concurrently referring to FIGS. 4A, 4B and 4C; an upper surface 402 of the protective cover 400 may be slip-resistant such that the content, e.g., silverware and/or the like, thereon may not move around when a force is applied to move the tray unit 100A, e.g., when the drawer containing the tray unit 100A is pulled or pushed. Further, the protective cover 400 may include one or more protrusions 410 on a bottom surface 404 thereof. The protrusions 410 may be configured to engage the recesses 160 on the upper surface of the bottom wall 120 such that the protective cover 400 may not move when a force is applied to the tray unit 100A. The protrusions 410 may be co-molded with the protective cover 400 as one piece.

[0046] While the drawer storage assembly 10 and tray units 100 have been shown as having substantially rectangular or square shapes, it is noted that the drawer storage assembly 10 and/or tray units 100 may have any practicable shape, including a circle shape, an elliptical shape, a triangle shape, a star shape, a hexagon shape, a pie shape and the like.

[0047] While the disclosure has been described in terms of exemplary embodiments, those skilled in the art will recognize that the disclosure can be practiced with modifications in the spirit and scope of the appended claims. These examples given above are merely illustrative and are not meant to be an exhaustive list of all possible designs, embodiments, applications or modifications of the disclosure.

What is claimed is:

1. A tray unit comprising:
   a main body that includes at least one storage space and a wall structure surrounding the at least one storage space, the wall structure comprising a bottom wall and a side wall surrounding the bottom wall to define the at least one storage space; and a magnet arranged with the wall structure at a location along a perimeter of the main body.

2. The tray unit of claim 1, further comprising a plurality of storage spaces separated from each other by the wall structure.

3. The tray unit of claim 1, wherein the magnet comprises:
   a first magnet arranged with a first side of the main body; and
   a second magnet arranged with a second side of the main body opposite to the first side.

4. The tray unit of claim 1, wherein the magnet comprises a first surface having a first polarity and a second surface having a second polarity.

5. The tray unit of claim 1, wherein the magnet is removable and reinsertable to allow one of the first and second surfaces thereof to face outwardly from the perimeter of the main body.

6. The tray unit of claim 1, wherein the wall structure comprises a recess configured to receive and hold the magnet at the location along the perimeter of the main body.

7. The tray unit of claim 6, wherein the recess is configured to receive and hold the magnet so that the magnet does not protrude outwardly from the perimeter of the main body.

8. The tray unit of claim 6, further comprising a magnet cover configured to cover the magnet.

9. The tray unit of claim 8, wherein the magnet cover comprises a marking for indicating a polarity.

10. The tray unit of claim 8, wherein the magnet cover comprises a magnet cap.

11. The tray unit of claim 10, wherein the main body further includes a strip formed around the perimeter thereof and comprising an opening exposing the recess, wherein the magnet cap is inserted into the opening of the strip to cover the magnet.

12. The tray unit of claim 8, wherein the magnet cover comprises a strip formed around the perimeter of the main body to cover the magnet.

13. The tray unit of claim 12, wherein the strip comprises a covering portion located correspondingly to the magnet.

14. The tray unit of claim 13, wherein the strip is removable.

15. The tray unit of claim 1, further comprising a protective cover configured to cover an upper surface of the bottom wall.

16. The tray unit of claim 15, wherein the protective cover comprises a protrusion formed on a bottom surface thereof to engage a recess formed correspondingly thereeto on an upper surface of the bottom wall.

17. A drawer storage assembly comprising the tray unit of claim 1.

18. The drawer storage assembly of claim 17, wherein the tray unit is a first tray unit, and the drawer storage assembly further comprises a second tray unit magnetically attached to the first tray unit.

19. The drawer storage assembly of claim 18, wherein the second tray unit comprises:
   a main body that includes at least one storage space and a wall structure surrounding the at least one storage space, the wall structure of the second tray unit comprising a bottom wall and a sidewall surrounding the bottom wall to define the at least one storage space; and
   a magnet arranged with the wall structure of the second tray unit at a location along a perimeter of the main body of the second tray unit.

20. The drawer storage assembly of claim 19, wherein a number of the storage spaces of the first tray unit is different from that of the second tray unit.

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