

REMOVABLE WINDOW/DOOR SCREEN

Field of the Invention

[0001] The present invention generally relates to a removable window/door screen, and more particularly to a multifunctional corner apparatus that can be used in the removable window or door screens.

Background of the Invention

[0002] Removable window or door screens are widely used for various purposes; for example, mesh screens for preventing insects. PCT publication WO99/49170 discloses a window screen system that uses magnet to hold the screen on the window/door frame. The system uses a flexible magnet strip which can easily be bonded along the window/door frame for installation, and the same type of flexible magnetic strip along the rim of the screen. Accordingly, the entire screen can easily be installed and removed without any additional attachment clip or fastener. However, aligning the screen in place could be problematic because the magnetic strips are free to move over each other. Further depending on the size and overall weight of the screen, it can also be challenging for holding the screen for a long period.

[0003] **FIG 1** shows a known mesh screen. The mesh screen **10** comprises two longitudinal rim members **11** and two horizontal rim members **12**; the four rim members are aligned in tandem to form a rectangular rim of the mesh screen. The mesh screen **10** further comprises four L-connectors **13** disposed at the four corners of the rim, each L-connector

having a slot for passively receiving the ends of one longitudinal rim member and one horizontal rim member and hold both ends in place. The mesh screen **10** further comprises an U-shaped holder **14** disposed onto the top of the frame to hold the mesh **16** tight. However, this holder contains no magnetic strip; there is a very small gap between the magnetic strip and the holder when the screen is installed (meaning that not fully sealed) because the thickness of the magnetic strip is different from the holder.

[0004] The rim members **11**, **12** and the L-connectors **13** offer great flexibility for installation over at window/door of any size. Installer can easily cut the rim members at the required length and they can be connected through the L-connectors at the four corners for form the screen frame.

[0005] The mesh screen **10** also comprises a handle piece **15** disposed onto one L-connector for lifting the mesh screen, where the handle piece is popped up from the L-connector.

Summary of the Invention

[0006] One aspect of the present invention provides a removable screen system for window/door frame. The system comprises a screen having a frame for holding a mesh sheet, the frame comprises rim members connected through a plurality of corner connectors, the screen further includes magnetic strips along the frame, and a retainer assembly for installing on the window frame, the retainer further includes magnetic strips corresponding to those on the screen for operationally holding the screen on the window/door frame. Preferably, at least one of the corners of the removable screen system is integrated with a hinged flap that can be held by a user's hand when it is lifted up.

[0007] In one embodiment, the hinged flap may be integrated on one of the corner connectors of the screen, the hinged flap can be operationally held by user hand for removing the screen from the retainer assembly.

[0008] In another embodiment, the hinged flap is integrated on a corner apparatus of the retainer assembly, wherein the corner apparatus is adapted for installing on the window/door frame, the corner apparatus defines a slot for receiving and aligning one of the corner connector of the screen. It is possible that the hinged flap on the corner connector further define a stopper for engaging the corner connector of the screen when the hinged flap is collapsed.

[0009] In yet a further embodiment, the corner apparatus may further include an L-base bottom panel; an L-base top panel; an L-base side panel. The L-base bottom and top panels are coupled by the L-base side panel to form an L-base with the slot that is configured to receive the corner connector of the screen, the L-base top panel further has a carve-out on its top surface, the hinged flap is linearly pivoted between the carve-out such that it can be collapsed and lifted up on the top panel.

[0010] In yet another embodiment, the hinged flap and the L-base top panel are coupled by a pivot pin being disposed at each side of the hinged flap and a corresponding pivot hole being formed on either side of the carve-out in the L-base top panel or vice versa.

[0011] Desireably, the hinged flap may include a stopper that is located near the inner intersection corner of the hinged flap and is able to pass over the L-base top panel, where the stopper has a length that is long enough to pass over the L-base top panel and reach the slot of the L-base when the hinged flap is in its collapsed position.

[0012] In a further embodiment, the stopper may comprise a protrusion on the L-base top panel, and a corresponding receiving hole for the protrusion on the hinged flap;

when the hinged flap is in its collapsed position, the protrusion is locked into the corresponding receiving hole.

[0013] Further the hinged flap may be mounted on two bottom corner connectors of the screen. Alternatively, the corner apparatus is provided as two top corners of the retainer assembly installed on the window/door frame.

[0014] In another aspect, there is provided a corner apparatus for a removable screen system. The corner apparatus may comprise a slot for receiving and aligning a corner connector of the aforesaid screen, and the hinged flap is adapted thereon for engaging the corner connector of the screen therein.

[0015] In a further aspect, there is provided a corner connector for the aforesaid screen, wherein the hinged flap is provided thereon as a handle for removing the screen from the window/door frame.

[0016] The objectives and advantages of the invention will become apparent from the following detailed description of preferred embodiments thereof in connection with the accompanying drawings.

Brief Description of the Drawings

[0017] Preferred embodiments according to the present invention will now be described with reference to the Figures, in which like reference numerals denote like elements.

[0018] **FIG 1** shows a perspective view of a mesh screen in the prior art;

[0019] **FIG 2** shows a window screen system in accordance with one embodiment of the present invention;

[0020] FIG 3 illustrates an L-connector of a window screen in accordance with an embodiment of the present invention;

[0021] FIG 4A illustrates a rear perspective view of a corner apparatus in its extended position in accordance with one embodiment of the present invention;

[0022] FIG 4B illustrates a front perspective view of the corner apparatus in its collapsed position as shown in FIG 4A;

[0023] FIG 4C shows a top view of the corner apparatus in its collapsed position as shown in FIG 4A;

[0024] FIG 4D shows a bottom view of the multifunctional corner apparatus in its collapsed position as shown in FIG 4A;

[0025] FIG 4E shows a front view of the corner apparatus in its collapsed position as shown in FIG 4A; and

[0026] FIG 5 shows a perspective view of a corner apparatus with a locking mechanism in accordance with one embodiment of the present invention.

Detailed Description of the Invention

[0027] The present invention may be understood more readily by reference to the following detailed description of certain embodiments of the invention.

[0028] Throughout this application, where publications are referenced, the disclosures of these publications are hereby incorporated by reference, in their entireties, into this application in order to more fully describe the state of art to which this invention pertains.

[0029] FIG 2 illustrates a window screen system 20 in accordance with an embodiment of the present invention. The window screen system 20 as shown is installed on a window frame 100. The window screen system 20 comprises a window screen 21 that is removable from the window frame 100, and a retainer assembly that is installed permanently on the window frame 100, wherein the retainer assembly is adapted for holding the window screen 21 in place on the window frame 100. The window screen 21 has a similar structure with that of the window screen 10 of FIG 1, where the window screen 21 too has horizontal and vertical rim members 11, 12 of the same or similar type connected via L-connectors to form a frame for holding mesh sheet thereon. And similar to that of the screen 10, there is provided magnetic strips on the window/door frame and the mesh frame so that the screen can be attached onto the window/door frame.

[0030] In the present embodiment, the window screen 21 further includes two corner holders 23 and two bottom connectors 25. The two corner holders 23 are two corner guides for attaching on the window frame. Preferably, the two corner holders 23 are installed on the top to corner of the window frame 100 as part of the retainer assembly of the window screen system 20.

[0031] The corner holder 23 is adapted with a slot for receiving an L-connector (not shown in FIG 2) of the same or similar type as shown in FIG 1, which is used for connecting a vertical and a horizontal rim members 11, 12. As the corner holder 23 is installed on the two corners of the window frame 100, it serves as guiding and alignment means for installing the window screen 21. The corner holder 23 further has a hinged flap 28 that can be flipped up and down. The hinged flap can be adapted with a securing means (not shown) for engaging the window screen 21 on the window frame 100.

[0032] The bottom connector **25** on the other hand serves as a L-connector for connecting the vertical and the horizontal rim members. It is adapted with the same or similar L-slots as the L-connector **13** in **FIG 1**, except that the bottom connector **25** is adapted with a hinged flap **29**. The hinged flap **29** has substantially the same configuration as the corner holder **23** except that it does not require any securing means because the hinged flap **29** is integrated on the window screen **21** and the bottom part of the window screen **21** is retained on the window frame **100** via the magnetic strip of the retainer assembly of the window screen system **20**. The hinged flap **29** can be used as a handle when it is lifted up. User may use the handle to lift up the window screen **21** from the bottom to remove the window screen **21** from the window frame **100**.

[0033] The hinged flap **28** and **29** are preferably adapted with the same shape and design for consistent looking.

[0034] It is well understood that the window screen **20** can be adapted as door screen for doorframe, in another embodiment of the present invention.

[0035] **FIG 3** illustrates an L-connector **30** of a window screen in accordance with an embodiment of the present invention. The L-connector **20** can be adapted for used as the bottom connector **25** of the window screen **21** of **FIG 2**. It comprises a L-slot where each end of the slot **31** is adapted for passively receiving the ends of one longitudinal rim member and one horizontal rim member to form a L-frame. It is understood to a skilled person that to form the screen, the L-connector **30** and the rim members are adapted for holding flexible mesh sheets thereon in any known way to form the window/door screen.

[0036] On an external facing surface **32** of the L-connector **30**, there is further provided with a hinged flap **35** thereon, whereby when the hinged flap **35** is in a collapsed configuration, it abuts the external facing surface **32** that substantially emerged into the L-

connector **30**, resulting in a more appealing appearance. The hinged flap **35** can be hinged on the external facing surface **32** in many configurations. In one configuration as illustrated in the **FIG 3**, the external facing surface **32** may define two holding blocks **34** at the two extreme end of the L-connector **30**, wherein the hinged flap **35** can be linearly pivoted between the two holding blocks **34**. The hinged flap **35** can be held on the holding blocks via any coupling means, such as a simple pin and notch defined on the holding blocks and the hinged flap **35**.

[0037] When the hinged flap **35** is lifted up, it can be used as a handle whereby user can easily “peel” the window screen off from the window/door frame when holding on to the hinged flap **35**. Preferably, the L-connector **30** is required only at either one or both of the bottom corners of the window screen. Once the hinged flap is not in used, it can again be flapped collapsing on the L-connector **30**.

[0038] Referring now to **FIGs 4A-4E** that illustrate various views of a corner apparatus **40** of one embodiment of the present invention. The corner apparatus **40** is adapted for being used for example in a removable window or door screen. The corner apparatus **40** is adapted as the corner holder **23** of the window screen system **20**. The corner apparatus **40** comprises an L-base bottom panel **41**, an L-base top panel **42**, an L-base side panel **43**, and a hinged flap **45**.

[0039] The L-base bottom and top panels **41**, **42** are coupled by the L-base side panel **43** to form an L-base with a slot; the slot is configured to receive an L-connector from a removable window/door screen. It is preferably that the L-base top panel **42** is thicker than the L-base bottom panel **41**, so that the L-base top panel **42** can have a carve-out **44** on its top surface.

[0040] The hinged flap **45** is coupled to the L-base top panel **42**; when the hinged flap **45** is in its collapsed position, it stays in the carve-out **44**. The coupling of the hinged flap **45** and the L-base top panel **42** can be achieved by any known means; for example, a pivot pin can be disposed at each side of the hinged flap **45** and a corresponding pivot hole can be formed on either side of the carve-out in the L-base top panel **42**; or vice versa.

[0041] The hinged flap **45** further comprises a stopper **46** that is located near the inner intersection corner of the hinged flap **45** and is able to pass over the L-base top panel, where the stopper **46** has a length that is long enough to pass over the L-base top panel **42** and reach the slot of the L-base when the hinged flap **45** is in its collapsed position; thereby the stopper **46** extends beyond the bottom rim of the frame of the window screen to hang it on the window frame when it is installed. In the case of the window screen **21** of **FIG 2**, the stopper **46** is in engagement with the L-connector of the window screen **21**. To release it, simply lift up the hinged flap **45** to release the window frame from the stopper **46**. One advantage of using this stopper is that the mesh or the like could be better maintained.

[0042] In another embodiment, the stopper **46** may exert a downward force against the L-connector of the window screen when the hinged flap **45** is in its collapsed position.

[0043] Referring now to **FIG 5** where a corner apparatus **50** in accordance with another embodiment of the present invention is illustrated. The corner apparatus **50** further comprises a locking mechanism; the locking mechanism comprises a protrusion **58** on a L-base top panel **52** of the corner apparatus **50**, and a corresponding receiving hole **59** for the protrusion **58** on the hinged flap **55**; when the hinged flap **55** is in its collapsed position, the protrusion **58** will be locked into the corresponding receiving hole **59**.

[0044] Similarly, the locking mechanism can be adapted over at the L-connector that has a hinged flap, such as the one illustrated in **FIG 3**, for example.

[0045] The corner apparatus **50** can be fabricated by any suitable materials for example plastics. The L-base and hinged flap **55** can be fabricated separately and assembled later.

[0046] During installation of a removable window/door screen, the corner apparatus of the present invention can be adhered to window/door frames using tapes or bonding means, which can be chemical bonding means or mechanical bonding means. In certain embodiments, two of the corner apparatus can be used to hold a removable window/door screen when they are coupled to the window/door frames.

[0047] While the present invention has been described with reference to particular embodiments, it will be understood that the embodiments are illustrative and that the invention scope is not so limited. Alternative embodiments of the present invention will become apparent to those having ordinary skill in the art to which the present invention pertains. Such alternate embodiments are considered to be encompassed within the scope of the present invention. Accordingly, the scope of the present invention is defined by the appended claims and is supported by the foregoing description.

CLAIMS

What is claimed is:

1. A removable screen system for window/door frame, the system comprising:

a screen having a frame for holding a mesh sheet, the frame comprises rim members connected through a plurality of corner connectors, the screen further includes magnetic strips along the frame,

a retainer assembly for installing on the window frame, the retainer further includes magnetic strips corresponding to those on the screen for operationally holding the screen on the window/door frame;

wherein at least one of the corners of the removable screen system is integrated with a hinged flap that can be held by a user's hand when it is lifted up, the hinged flap is integrated on a corner apparatus of the retainer assembly, wherein the corner apparatus is adapted for installing on the window/door frame, the corner apparatus defines a slot for receiving and aligning one of the corner connector of the screen.

2. The removable screen system according to claim 1, further comprising a hinged flap that integrated on one of the corner connectors of the screen, the hinged flap of the corner connector can be operationally held by user hand for removing the screen from the retainer assembly.

3. The removable screen system according to claim 1, wherein the hinged flap on the corner apparatus further define a stopper for engaging the corner connector of the screen when the hinged flap is collapsed.

4. The removable screen system according to claim 1 the corner apparatus comprising:

an L-base bottom panel;

an L-base top panel;

an L-base side panel; and

wherein the L-base bottom and top panels are coupled by the L-base side panel to form an L-base with the slot that is configured to receive the corner connector of the screen, the L-base top panel further has a carve-out on its top surface, the hinged flap is linearly pivoted between the carve-out such that it can be collapsed and lifted up on the top panel.

5. The removable screen system according to claim 4, wherein the hinged flap and the L-base top panel are coupled by a pivot pin being disposed at each side of the hinged flap and a corresponding pivot hole being formed on either side of the carve-out in the L-base top panel or vice versa.

6. The removable screen system according to claim 4, wherein the hinged flap further comprises a stopper that is located near the inner intersection corner of the hinged flap and is able to pass over the L-base top panel, where the stopper has a length that is long enough to pass over the L-base top panel and reach the slot of the L-base when the hinged flap is in its collapsed position.

7. The removable screen system according to claim 4, wherein the stopper comprises a protrusion on the L-base top panel, and a corresponding receiving hole for the protrusion on the hinged flap; when the hinged flap is in its collapsed position, the protrusion is locked into the corresponding receiving hole.

8. The removable screen system according to claim 2, wherein the hinged flap is mounted on two bottom corner connectors of the screen.

9. The removable screen system according to claim 1, wherein the corner apparatus is provided as two top corners of the retainer assembly installed on the window/door frame.

10. A corner apparatus of a removable screen system, the corner apparatus comprises a slot for receiving and aligning a corner connector of a screen of the removable screen system as defined in any one of the preceding claims, and the hinged flap is adapted thereon for engaging the corner connector of the screen in the slot.