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# FIBER MANAGEMENT TRAY ARRANGEMENTS AND ASSEMBLIES FOR FIBER OPTIC CLOSURE ORGANIZERS

## Abstract

Devices, arrangements and methods for routing and connecting optical fibers at fiber organizers of telecommunications closures. The organizers include pivotal tray arrangements for improved versatility and quantity of fiber routing configurations within a telecommunications closure of a given size.

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## Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION [0001] This application is a continuation of U.S. patent application Ser. No. 17/798,522, filed on Aug. 9, 2022, which is a National Stage Application of PCT/US2021/017698, filed on Feb. 11, 2021, which claims the benefit of U.S. Patent Application Ser. No. 62/972,919, filed on Feb. 11, 2020, the disclosures of which are incorporated herein by reference in their entireties. To the extent appropriate, a claim of priority is made to each of the above-disclosed applications.

TECHNICAL FIELD
[0002] The present disclosure relates to telecommunications enclosures, and more particularly to fiber management arrangements for routing and managing fibers at fiber organizer assemblies housed in telecommunications closures.
BACKGROUND
[0003] Telecommunications systems typically employ a network of telecommunications cables capable of transmitting large volumes of data and voice signals over relatively long distances. Telecommunications cables can include fiber optic cables, electrical cables, or combinations of electrical and fiber optic cables. A typical telecommunications network also includes a plurality of telecommunications enclosures integrated throughout the network of telecommunications cables. The telecommunications enclosures or “closures” are adapted to house and protect telecommunications components such as splices, termination panels, power splitters, wave division multiplexers, fiber management trays, cable organizing and routing components, etc.
[0004] It is often preferred for telecommunications enclosures to be re-enterable. The term “re-enterable” means that the telecommunications enclosures can be reopened to allow access to the telecommunications components housed therein without requiring the removal and destruction of the telecommunications enclosures. For example, certain telecommunications enclosures can include separate access panels that can be opened to access the interiors of the enclosures, and then closed to reseal the enclosures. Other telecommunications enclosures take the form of elongated sleeves formed by wrap around covers or half-shells having longitudinal edges that are joined by clamps or other retainers. Still other telecommunications enclosures include two half-pieces that are joined together through clamps, wedges or other structures.
[0005] In certain applications, the enclosure/housing needs to be water and contaminant (e.g., dust) proof or water-resistant. In particular, water, moisture, cleaning fluids, dust etc., present at the exterior of the housing/enclosure should be prevented by the housing/enclosure from reaching components within the interior of the enclosure/housing. To provide such protection, enclosures can include a seal (e.g., a gel seal) around the perimeter of the enclosure or portions of the perimeter of the enclosure. One or more sealing blocks (e.g., gel blocks) housed in one of the housing pieces can be compressed against corresponding sealing blocks in another housing piece to form a seal therebetween. To accommodate cables or entering the enclosure through ports in the enclosure wall, corresponding sealing blocks positioned at the port locations of the enclosure can include sealing blocks that define cable passages such that the sealing blocks can be compressed around the cable forming a seal.
[0006] Typically, telecommunications closures house a fiber organizing assembly having equipment for organizing fibers, storing fibers, and optically connecting provider side fibers to subscriber side fibers. A given closure can accommodate different types of optical connections between fibers, such as connector to connector connections and splice connections. The organizer

is typically sized according to the interior volume of the closure. It is generally desirable to maximize the number of fibers that can be managed within a given closure volume, as well as to maximize the versatility of the closure to manage different types of optical connections and different types of cables.

SUMMARY

[0007] In general terms, the present disclosure is directed to improvements in fiber management equipment of fiber organizers of telecommunications closures.

[0008] In one aspect, the present disclosure is directed to an improved telecommunications closure.

[0009] In another aspect, the present disclosure is directed to an improved organizer of a telecommunications closure.

[0010] In another aspect, the present disclosure is directed to an improved fiber management tray arrangement of an organizer of a telecommunications closure.

[0011] In another aspect, the present disclosure is directed to an improved fibber routing configuration using an organizer of a telecommunications closure and a tray arrangement of the organizer in accordance with principles of the present disclosure.

[0012] According to certain aspects of the present disclosure, a fiber management organizer for a telecommunications closure, comprises: a main body including a wall defining an upper region above the wall and a lower region below the wall, the upper region including an upper cable fixation portion and an upper fiber management portion, the lower region including a lower cable fixation portion and a lower fiber management portion; a first fiber management tray pivotally coupled to the main body at the upper fiber management portion, the first fiber management tray including: a first fiber management surface facing a first direction; a second fiber management surface facing a second direction opposite the first direction; a first wall projecting from the first fiber management surface in the first direction about at least a portion of an outer perimeter of the first fiber management surface; and a second wall projecting from the first fiber management surface in the second direction about at least a portion of an outer perimeter of the second fiber management surface; wherein each of the first and second fiber management surfaces define structures for mounting optical fiber splice holders at the first and second fiber management surfaces, respectively.

[0013] According to further aspects of the present disclosure, a fiber management organizer for a telecommunications closure is provided, the fiber management organizer extending along a longitudinal axis between a proximal end and a distal end of the fiber management organizer, along a transverse axis between a first side and a second side of the fiber management organizer, and along a vertical axis between a top and a bottom of the fiber management organizer, the fiber management organizer comprising: a main body including a wall defining an upper region above the wall and a lower region below the wall, the upper region including an upper cable fixation portion and an upper fiber management portion, the lower region including a lower cable fixation portion and a lower fiber management portion; a first fiber management tray pivotally coupled to the main body at the upper fiber management portion by a first hinge defining a first pivot axis, the first fiber management tray being pivotal in a first pivot direction about the first pivot axis between a first storage position and a first access position; and a second fiber management tray pivotally coupled to the main body at the upper fiber management portion by a second hinge defining a second pivot axis, the second fiber management tray being pivotal about the second pivot axis in a second pivot direction between a second storage position and a second access position, wherein the first and second fiber management trays are vertically stacked one above the other when the first and second fiber management trays are in the storage positions; and wherein the first and second pivot directions are different from each other.

[0014] According to further aspects of the present disclosure, a fiber management organizer for a telecommunications closure, comprises: a main body including a wall defining an upper region above the wall and a lower region below the wall, the upper region including an upper cable

fixation portion and an upper fiber management portion, the lower region including a lower cable fixation portion and a lower fiber management portion; a first fiber management tray pivotally coupled to the main body at the upper fiber management portion, the first fiber management tray including a wall dividing a first fiber loop storage basket defined by the first fiber management tray from a second fiber loop storage basket defined by the first fiber management tray; and a group of sheathed optical fibers housed in a sheath, a first length of the sheath being stored at the lower fiber management portion, the sheath extending from the lower fiber management portion to the first fiber loop storage basket, a second length of the sheath being stored in the first fiber loop storage basket, the sheath terminating at a sheath end positioned in the first fiber loop storage basket, the group of optical fibers extending from the sheath end to the second fiber loop storage basket via a fiber pathway defined by the fiber management tray, first lengths of the group of optical fibers being stored in loops in the second fiber loop storage basket.

[0015] According to further aspects of the present disclosure, fiber management organizer for a telecommunications closure, comprises: a main body including a wall defining an upper region above the wall and a lower region below the wall, the upper region including an upper cable fixation portion and an upper fiber management portion, the lower region including a lower cable fixation portion and a lower fiber management portion; a first fiber management tray pivotally coupled to the main body at the upper fiber management portion, the first fiber management tray including: a first fiber management surface facing a first direction; a second fiber management surface facing a second direction opposite the first direction; a first wall projecting from the first fiber management surface in the first direction about at least a portion of an outer perimeter of the first fiber management surface; and a second wall projecting from the first fiber management surface in the second direction about at least a portion of an outer perimeter of the second fiber management surface, wherein first and second fiber management surfaces define first and second structures, respectively for mounting optical fiber splice holders at the first and second fiber management surfaces, respectively; a first group of optical fibers extending from the lower fiber management portion to the first fiber management surface, the first group of optical fibers being spliced to second optical fibers at splices held at splice holders mounted to the first structures, the second optical fibers extending from the first fiber management surface to the lower fiber management portion; and a third group of optical fibers extending from the lower fiber management portion to the second fiber management surface, the third group of optical fibers being spliced to fourth optical fibers at splices held at splice holders mounted to the second structures, the fourth optical fibers extending from the first fiber management surface to the lower fiber management portion.

[0016] According to further aspects of the present disclosure, a method comprises: providing a fiber management organizer for a telecommunications closure, including a main body including a wall defining an upper region above the wall and a lower region below the wall, the upper region including an upper cable fixation portion and an upper fiber management portion, the lower region including a lower cable fixation portion and a lower fiber management portion; routing a first optical fiber from the lower fiber management portion to a first side of a back-to-back fiber management tray pivotally coupled to the main body; and routing a second optical fiber from the lower fiber management portion to a second side of the back-to-back fiber management tray, the first and second sides facing opposite directions.

[0017] According to further aspects of the present disclosure, a method comprises: providing a fiber management organizer for a telecommunications closure, including a main body including a wall defining an upper region above the wall and a lower region below the wall, the upper region including an upper cable fixation portion and an upper fiber management portion, the lower region including a lower cable fixation portion and a lower fiber management portion; routing a first optical fiber from the lower fiber management portion to a first side of a back-to-back fiber management tray pivotally coupled to the main body; and routing the first optical fiber from the

first side of the back-to-back fiber management tray to a second side of the fiber management tray, the second side being opposite the first side.
[0018] A variety of additional inventive aspects will be set forth in the description that follows. The inventive aspects can relate to individual features and to combinations of features. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the broad inventive concepts upon which the embodiments disclosed herein are based.

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## Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0019] The following drawings are illustrative of particular embodiments of the present disclosure and therefore do not limit the scope of the present disclosure. The drawings are not to scale and are intended for use in conjunction with the explanations in the following detailed description. Embodiments of the present disclosure will hereinafter be described in conjunction with the appended drawings, wherein like numerals denote like elements.
[0020] FIG. **1** is a perspective view of a telecommunications closure in accordance with the present disclosure, the closure being in a closed configuration.
[0021] FIG. **2** is a perspective view of the housing pieces of the closure of FIG. **1**.
[0022] FIG. **3** is a perspective view of an assembly of an optical fiber management organizer according to the present disclosure, including cables and fibers, and with an upper back-to-back fiber management tray of the organizer being covered.
[0023] FIG. **4** is a perspective view of the assembly of FIG. **3**, with the upper back-to-back fiber management tray being uncovered.
[0024] FIG. **5** is a further perspective view of the assembly of FIG. **3**.
[0025] FIG. **6** is a partially exploded view of the organizer of FIG. **3**.
[0026] FIG. **7** is a further partially exploded view of the organizer of FIG. **3**.
[0027] FIG. **8** is a perspective view of the organizer of FIG. **3**, with the upper back-to-back fiber management tray in a pivoted up position, and a second back-to-back fiber management tray in a pivoted down position.
[0028] FIG. **9** is a further perspective view of the organizer of FIG. **3**, with the upper back-to-back fiber management tray in the pivoted up position, and a lower back-to-back fiber management tray in the pivoted down position.
[0029] FIG. **10** is a perspective view of the organizer of FIG. **3**, with the upper back-to-back fiber management tray in a pivoted up position, and the lower back-to-back fiber management tray in a pivoted up position.
[0030] FIG. **11** is a further perspective view of the organizer of FIG. **3**, with the upper back-to-back fiber management tray in the pivoted up position, and the second back-to-back fiber management tray in the pivoted up position.
[0031] FIG. **12** is a further perspective view of the organizer of FIG. **3**, with the upper back-to-back fiber management tray in the pivoted up position, and the second back-to-back fiber management tray in the pivoted up position.
[0032] FIG. **13** is a top perspective view of the main body of the fiber organizer of FIG. **3**.
[0033] FIG. **14** is a bottom perspective view of the main body of FIG. **13**.
[0034] FIG. **15** is a top planar view of the main body of FIG. **13**.
[0035] FIG. **16** is a top perspective view of the lower back-to-back tray of the organizer of FIG. **3**.
[0036] FIG. **17** is a bottom perspective view of the lower back-to-back tray of the organizer of FIG. **3**.
[0037] FIG. **18** is a top perspective view of the upper back-to-back tray of the organizer of FIG. **3**.

[0038] FIG. **19** is a bottom perspective view of the upper back-to-back tray of the organizer of FIG. **3**.
[0039] FIG. **20** is a bottom perspective view of the organizer of FIG. **3** showing a pair of feeder or branch cables entering the closure and fixed to the organizer, sheathed groups of fibers extending from the feeder cables being looped in the lower fiber management portion of the organizer.
[0040] FIG. **21** is a top perspective view of the organizer of FIG. **3**, showing fiber routing configurations at the lower side of the back-to-back upper tray and the upper side of the back-to-back lower tray.
[0041] FIG. **22** is a top perspective view of the organizer and routing configurations of FIG. **21**, with the back-to-back lower tray in a pivoted up position.
[0042] FIG. **23** is an enlarged view of a portion of the components of FIG. **21**.
[0043] FIG. **24** is an enlarged view of the lower side of the back-to-back lower tray of FIG. **21**.
[0044] FIG. **25** is a perspective view of a portion of the organizer as in FIG. **21**.
[0045] FIG. **26** is a planar view of an example fiber routing configuration on the upper side of the back-to-back upper tray of the organizer of FIG. **21**.
[0046] FIG. **27** is a planar view of an example fiber routing scheme on the lower side of the back-to-back upper tray of the organizer of FIG. **21**.
[0047] FIG. **28** is a perspective view of a hinge clip of the organizer of FIG. **3**.
[0048] FIG. **29** is a further perspective view of the hinge clip of the organizer of FIG. **3**.

## DETAILED DESCRIPTION

[0049] Various embodiments of the present invention will be described in detail with reference to the drawings, wherein like reference numerals represent like parts and assemblies throughout the several views. Reference to various embodiments does not limit the scope of the invention, which is limited only by the scope of the claims attached hereto. Additionally, any examples set forth in this specification are not intended to be limiting and merely set forth some of the many possible embodiments for the claimed invention.
[0050] Referring to FIGS. **1-2**, a telecommunications closure **10** extends along a longitudinal axis **12** between a proximal end **14** and a distal end **16**. The closure **10** extends along a transverse axis **18** between a first side **20** and a second side **22**. The closure **10** extends along a vertical axis **24** between a top **26** and a bottom **28**. The axes **12**, **18** and **24** are mutually perpendicular, with the axes **12** and **18** defining a horizontal plane.
[0051] As used herein, terms such as proximal, distal, top, bottom, upper, lower, vertical, horizontal and so forth will be used with reference to the axes **12**, **18**, and **24** of FIG. **1** and in relating the positions of one component to another with respect to the full closure assembly of FIG. **1**. These relative terms are for ease of description only, and do not limit how the closure **10** or any individual component or combination of components, may be oriented in practice.
[0052] The closure **10** includes a first upper housing piece **30** and a second lower housing piece **32** that cooperate (e.g., with hinges, clamps, etc.) to form a scalable and re-enterable closure volume **40**. A perimeter seal element **31** forms a seal about three sides of the closure volume **40** when the closure **10** is in a sealed and closed configuration.
[0053] The closure volume **40** is configured to house a cable organizer **34**. An internal portion (not shown in FIGS. **1-2**) of the cable organizer **34** is positioned within the closure volume **40**. An external portion **35** of the cable organizer **34** is positioned exterior to the closure volume **40**, with the cable organizer **34** extending through a proximally positioned opening **36** defined between the proximal ends of the first and second housing pieces **30** and **32**. Cables enter the closure volume **40** via the opening **36** and the sealed cable ports defined by the internal portion of the cable organizer **34**.
[0054] The cable organizer **34** is configured to accommodate relatively thick cables (such as feeder cables and branch cables) entering the closure **10** via a lower region **38** of the cable organizer **34**, and relatively thin cables (such as drop cables) entering the closure via an upper region **42** of the

cable organizer **34**.
[0055] Referring now to FIGS. **3-12**, a cable organizer (or organizer) **100** in accordance with the present disclosure will be described. The cable organizer **100** can cooperate with housing pieces of a closure such as described above. For example, the cable organizer **100** can cooperate with the housing pieces **30**, **32** as described above with respect to FIGS. **1** and **2**, an internal portion of the organizer being positioned in the closure volume **40**. Other than at the proximal side, the housing pieces **30**-**32** do not form another opening to the outside of the closure.
[0056] The organizer **100** extends along a longitudinal axis **102** from a proximal end **103** to a distal end **104**, along a transverse axis **106** from a first side **108** to a second side **110**, and along a vertical axis **112** from a top **114** to a bottom **116**. The axes **102**, **106** and **112** are mutually perpendicular, with the axes **102** and **106** defining a horizontal plane. The organizer **100** optionally includes an external portion **118** (FIG. **21**) configured to be positioned outside of a closure volume and an internal portion **120** positioned distally from the external portion **118** and configured to be positioned within a closure volume. In some examples, the external portion **118** and the internal portion **120** of the organizer are of unitary construction. Alternatively, the external portion is constructed separately and attached to the internal portion.
[0057] The organizer **100** is generally divided by one or more panels, walls, or other structures between an upper region **122** and a lower region **124**. Some of these panels, walls and other structures form an integrated unit that serves as a main support structure **111** of the organizer **100**. In some examples, the internal portion **120** of the organizer **100** corresponds to the main support structure or main body **111**, and the external portion **118** is coupled to the main body **111**. The organizer **100** defines one or more channels **180** and other guiding structures for guiding optical fibers between the upper and lower regions.
[0058] The channels **180** can include clipping interfaces **182** for mounting sheath clamps of sheaths containing fibers that are being routed between the upper and lower regions (FIG. **13**) such that an optical fiber from a cable (e.g., a feeder cable or a branch cable) fixed in the lower region can be optically coupled to an optical fiber of a cable (e.g., a drop cable **50**) fixed at the cable fixation region. In addition, fibers from provider side branch or feeder cables can be connected (e.g., spliced) to subscriber side branch cables, with both provider and subscriber side cables entering the closure and being fixed to the organizer **100**.
[0059] The internal portion **120** includes in the upper region **122** a cable fixation portion **126**, and a fiber management portion **128** positioned distally from the cable fixation portion **126**. The internal portion **120** also includes in the lower region **124** a cable fixation portion **130** and a fiber management portion **132** positioned distally from the cable fixation portion **130**. The cable fixation portions **126** and **130** are generally vertically aligned. The fiber management portions **128** and **132** are generally vertically aligned.
[0060] The lower fiber management portion **132** is partially defined by a side wall **134** and a horizontal downward facing surface **136** of a panel **138**, together forming a basket **139**. The basket **139** of the lower fiber management portion **132** can serve as a storage area for looped fiber from the feeder cables or branch cables. The looped fiber can be in the form of loose fibers, loose fibers protected in groups by tubes or sheaths, fiber ribbons, etc. Fibers can be guided from the lower fiber management portion **132** to the upper fiber management portion via guides and the channels **180** at the distal end of the organizer **100**. Once at the upper fiber management portions, the fiber can be further managed, e.g., with splices, connectors and adapters, splitters, wave division multiplexors, etc.
[0061] The upper fiber management portion **128** can also include one or more banks **150** of fiber optic adapters **152**. The adapters **152** can be used to optically connect connectorized drop cables **50** having connectors **52** with connectorized fibers **54** having connectors **56** terminating the fibers **54**. In this example, two banks **150** of adapters **152** are arranged side by side parallel to the transverse axis **106**. In other examples, zero or two banks of adapters can be provided aligned with one

another parallel to the transverse axis **106**. Where adapters are not longitudinally aligned with entering cables, non-connectorized drop cables can be fixed in the upper cable fixation portion **126** and their fibers managed in the upper fiber management portion **128**. Thus, the upper region of the organizer **100** can accommodate connectorized drop cables, non-connectorized drop cables, or a combination of connectorized and non-connectorized drop cables. Other cable types and configurations can also be accommodated and managed at the cable fixation portion **126**. In alternative examples, the adapters, or non-functional receptacles that behave like one-sided adapters, can serve as parking or storage for the connectors **52** or the connectors **56** until an active fiber optic connection is needed. The connectors can be any suitable form factor, such as, but not limited to, one or more of LC form factor, SC form factor, and MPO form factor connectors.

[0062] The upper cable fixation portion **126** and the lower cable fixation portion **130** are separated by a wall **154**. The wall includes an upward facing horizontal surface **156** and a downward facing horizontal surface **158**. The surfaces **156** and **158** can support cable fixation assemblies. Example cable fixation assemblies are described in, e.g., International PCT Patent Application No. PCT/US2020/014634 filed Jan. 22, 2020 and U.S. Provisional Patent Application No. 62/972,864, filed Feb. 11, 2020, the contents of which applications are fully incorporated herein by reference in their entireties.

[0063] Positioned proximally of the cable fixation portions **126** and **130** is a seal region **160** (FIG. **21**) of the organizer **100**. The seal region **160** includes a plurality of dividers **162** and **164** in the upper region **122** and the lower region **124**, respectively, of the organizer **100**. The dividers **162** define openings **166** through which connectorized drop cables **50** or non-connectorized drop cables enter the closure. The dividers **164** define openings **173** through which feeder cables, branch cables or the like enter the closure. In the space between rows of dividers there are placed seal blocks **174**. The seal blocks **174** form seals around the cables entering the closure. The seal blocks **174** also serve to seal off the proximal opening of the closure defined between the housing pieces of the closure.

[0064] In an example cable configuration, one or two feeder cables enter the lower region **124** via cable ports at the proximal end of the organizer **100** and have jacketed portions affixed at the cable fixation portion **130**. Optical fibers from the one or more feeder cables are stored in loops in the fiber management portion **132**. In some examples, the optical fibers are held in protective sheaths that are stored in loops in the basket **139** of the fiber management portion **132**. Each sheath can hold a plurality of fibers such as, e.g., 4, 6, 8, 10, 12 or more fibers. Portions of the sheaths can be routed to the upper region **122** via channels **180** at the rear of the main body **111** for further fiber management.

[0065] In addition, branch cables can enter the lower region **124** via further ones of the cable ports at the proximal end of the organizer **100**, with jacketed portions of the branch cables being affixed at the cable fixation portion **130**. For example, a provider side feeder or branch cable and a subscriber side branch cable can enter the closure at the lower region **124**. Fibers from the provider side feeder or branch cable can be spliced to fibers of the subscriber side branch cable, with the fibers and splices being managed at the organizer **100**. In some examples, the optical fibers of the branch cables are held in protective sheaths that are stored in loops in the basket **139** of the fiber management portion **132**. Each sheath can hold a plurality of fibers such as, e.g., 4, 6, 8, 10, or 12 or more fibers. Portions of the sheaths can be routed to the upper region **122** via channels **180** at the rear of the main body **111** for further fiber management. The provider side feeder or branch cable can be routed to the closure from, e.g., another closure on the provider side of the network, e.g., larger closure. The subscriber side branch cable can be routed from the closure to another closure on the subscriber side of the network, e.g., a smaller closure, such as a multiport service terminal (MST).

[0066] Components and assemblies at the upper region **122** will now be described. In general terms, these components and assemblies can provide improvements and/or advantages in fiber

routing and management capabilities using the organizer **100**. The capabilities that can be improved can include higher numbers of fibers that can be managed per unit volume of the closure volume of the closure and/or versatility in the types of fiber management that can be performed using a single organizer **100** of a single closure.

[0067] The main body **111** includes the wall **154** defining the upper region **122** above the wall and a lower region **124** below the wall.

[0068] Referring to FIGS. **3**-**14**, **18**, **19**, **28** and **29**, an upper fiber management tray **200** is a back-to-back tray that is pivotally coupled to the main body **111** at the upper fiber management portion **130**. Optionally, the fiber management tray **200** includes two trays that are coupled to each other back-to-back in a reversible manner. Optionally, the fiber management tray **200** includes two trays that are permanently affixed to each other back-to-back. Optionally, the fiber management tray **200** is of a single unitary (e.g., seamless) construction.

[0069] Hinging clips **202** (FIGS. **28**-**29**) include resilient pegs **204** that mechanically snap into holes in the wall **190** of the main body **111** and in holes or depressions **206** of the fiber management tray **200**. Each hinge clip **202** includes a flexibly resilient hinge joint **208**, and a hinge axis or pivot axis **210** is defined at the hinge clips **202** about which the tray **200** can pivot relative to the main body **111**. In FIGS. **3** and **4** the upper tray **200** is in the pivoted down position, or storage position, about the pivot axis **210**. In FIGS. **8**, **9** and **10** the upper tray **200** is in the pivoted up position, or access position. Optionally, when fibers managed on either side of the tray **200** are not being managed, that side of the tray can be covered with a protective cover, such as the cover **212**. To perform fiber management, the cover **212** can be removed and then replaced (e.g. by mechanically snapping it to the tray **200**) after the fiber management has been performed.

[0070] The upper fiber management tray **200** includes a first fiber management surface **214** facing a first direction **215** and a second fiber management surface **216** facing the opposite direction **217** of the first direction **215**. Thus, the first and second surfaces **214** and **216** are back to back. A wall **218** projects from the surface **214** in the first direction **215** about at least a portion of an outer perimeter of the fiber management surface **214**. A wall **220** projects from the fiber management surface **216** in the second direction **217** about at least a portion of the outer perimeter of the second fiber management surface **216**. Entryways **222**, **224** on the front and back sides of the tray **200** provide fiber access onto the fiber management surfaces **214** and **216**, respectively. Fibers, or sheathed fibers, can enter the front or back areas of the tray **200** via the channels **180** and the entryways **222**, **224**. The entryways **222**, **224** can include toothed structures **237**, **239** defining clipping interfaces to securely mount fiber sheath couplers **241** (FIGS. **23**, **26**, **27**) at the respective entryway **222**, **224**, e.g., with zip ties **243**. In the fiber management portion **132** of the lower region **124**, looped sheaths of fibers can be tied, e.g., using a zip tie **243** to a support wall **195** projecting vertically downward from the wall **154**. The support wall **195** can define holes **196** and or notches **197** to receive such a zip tie **243** (FIGS. **14**, **20**).

[0071] Each of the first and second fiber management surfaces **214** and **216** defines structures **226** for mounting optical fiber splice holders **228** or other fiber management components (such as splitters, splitter holders wave division multiplexors, etc.) at the first and second fiber management surfaces, respectively. The structures **226** at the first and second surfaces **214** and **216** are structurally identical to each other and include tapered openings and retaining members in the form of cantilever arms. The splice holders mounted at the surfaces **214**, **216** can be configured to hold individual fiber to individual fiber splice bodies at a plurality of longitudinally aligned splice body locations and/or multiple fiber to multiple fiber splice bodies (e.g., with fiber ribbons) at a plurality of longitudinally aligned splice body locations. In some examples, the surface **214** is fitted with single fiber splice body holders, while the surface **216** is fitted with multi-fiber splice body holders, or vice versa.

[0072] Fiber retainers or fingers **230**, **232** project parallel to the surfaces **214**, **216** (transversely when the tray **200** is in the pivoted down or storage position) from the walls the **218** and **220** to aid

in retaining looped fibers at the corresponding surface **214**, **216** of the tray **200**. Optionally, in some example embodiments (FIGS. **26-27**) additional fiber retainers or fingers **250** and **252** can be provided generally centrally, projecting from the surfaces **214**, **216**, to retain S-curve routing of fibers at the surfaces **214**, **216**. S-curves can be used to switch the routing direction of at least some of the fibers so that fibers that are to be spliced to each other transversely approach the appropriate splice location from opposite directions. At each surface **214**, **216**, the retainers **250**, **252** can be placed longitudinally between two sets of the optical management component mounting structures **226**.

[0073] The main body **111** includes a flange **192** vertically projecting from the wall **191** which is transversely opposite the wall **190** that hingedly supports the tray **200**. The flange **192** defines an opening **193**. The back-to-back tray **200** includes a catch **234**. The catch **234** and the opening **193** opening are configured to mechanically engage each other to lock the tray **200** in a pivoted down position. The flange **192** has flexible resilience that allows the catch to be disengaged from the opening **193** in order to pivot the tray **200** into the pivoted up or access position about the hinge axis **210**. The hinge clips **202** can be configured to resist further pivoting of the tray **200** beyond a particular angle (e.g., beyond 90 degrees or more from the storage configuration or more). Additional pivot stop mechanisms can be provided to hold the tray **200** at a desired pivoted up position relative to the main body **111**.

[0074] Referring to FIGS. **3-19**, the organizer **100** includes a lower fiber management tray **300** that is also pivotally coupled to the main body **111** at the upper fiber management portion **128**. The tray **300** includes a wall **302** dividing a first fiber loop storage basket **304** defined by the tray **300** from a second fiber loop storage basket **306** defined by the tray **300**. The baskets **304** and **306** face opposite directions **308** and **310**, respectively. Thus, the tray **300** is a back-to-back tray. The wall **302** includes a surface **312** facing the direction **308**, and a surface **314** facing the opposite direction **310**. Projecting from the surface **312** in the direction **308** is a wall **316** about a portion of an outer perimeter of the surface **312**. Projecting from the surface **314** in the direction **310** is a wall **318** about a portion of an outer perimeter of the surface **314**. Projecting from the walls **316**, **318** parallel to the surfaces **312**, **314** (transversely when the tray **300** is in the pivoted down or storage position) are fiber retainers or fingers **320**, **322**. The surface **312**, the wall **316** and the retainers **320** define the basket **304**. The surface **314**, the wall **318** and the retainers **322** define the basket **306**.

[0075] Entryways **324**, **326** are provided for fibers, or sheathed groups of fibers to be guided onto the respective fiber management surface **312**, **314**. The entryways **324**, **326** can include guide channels **328** to which protective sheaths of fiber groups can be secured. In addition to using the entryways **324**, **326** to guide fibers on and off the tray **300**, the entryways **324**, **326** can be used to guide fibers from one of the baskets **304**, **306** to the other of the baskets **304**, **306**.

[0076] At the distal end of the tray **300** are hinge elements (e.g., hinge pins) **330** that are complementary to hinge elements **140** of the main body **111**. The hinge elements **330** can couple with the hinge elements **140** to form a hinge **332** defining a hinge axis or pivot axis **334**. A pivot stop **336** can restrict pivoting of the tray **300** about the hinge axis **334** beyond a maximum pivot angle (e.g., 90 degrees or more) from the pivot down or storage position of the tray **300** with respect to the main body **111**.

[0077] When the trays **200** and **300** are both in the pivot down or storage positions the trays **300** and **200** are vertically stacked one above the other, and the surfaces **214**, **216**, **312** and **314** are generally all oriented horizontally and generally parallel to one another.

[0078] To access the lower tray **300**, the upper tray **200** is pivoted up about its hinge axis **210** in a first pivot direction **260**. To access the surface **314** of the lower tray, the lower tray **300** is then pivoted up about its hinge axis **354** in a second pivot direction **360**. Due to the positioning and orientation of the hinge axes **210** and **354**, the pivot directions **260** and **360** are different. For example, the pivot directions can be offset by 90 degrees, by **180** degrees, or by some other non-zero angle therebetween. In addition the hinge axes **210** and **334** are angularly offset from each

other by an angle α. The angle α can be, e.g., 90 degrees, 180 degrees, or some angle therebetween. By separating the hinges, the pivot axes, and the pivot directions, organization of the fibers at the fiber organizer **100** can be improved.

[0079] Optionally, the organizer **100** includes an adapter mounting module **400**. The module **400** includes latch arms **402** configured to releasably catch and lock at openings **404** defined by the main body **111**. The module **400** is configured to mount the adapter banks **402** and includes a guide channel **404**. Connectorized optical fibers from the basket **306** of the tray **300** can be routed to the adapters **152** via the guide channel **404**.

[0080] Referring now to FIGS. **20**-**27**, example fiber routing configurations using the organizer **100** will be described.

[0081] Referring to FIG. **20**, feeder (or branch) cables **500** and **502** enter the closure and are fixed to cable fixation plate assemblies **504** positioned at the cable fixation portion **130** of the lower region **124** of the main body **111**. One of the cables **500**, **502** can be a provider side cable and the other cable **500**, **502** can be a subscriber side cable. The outer jackets of the feeder (or branch) cables **502** and **504** have been stripped, exposing sheaths **508**, **510** that hold and protect a plurality of loose fibers, e.g., 4, 6, 8, 10, 12 or more fibers per sheath **508**, **510**. Most of the sheaths **508**, **510** of fibers are stored in loops **512** in the lower fiber management portion **132**. Some of the sheaths **508**, **510** are routed to the upper region **122** of the main body **111** via the channels **180**.

[0082] Referring to FIGS. **21**-**23**, one of the sheaths **508** of fibers and one of the sheaths **510** of fibers are routed onto the fiber management surface **216** of the back-to-back tray **200** and another of the sheaths **508** of fibers and another of the sheaths **510** of fibers are routed onto the fiber management surface **214** of the back-to-back tray **200**. In addition, one of the sheaths **510** of fiber is routed to the basket **304** of the tray **300** where it is stored in loops. At the basket **304**, the sheath **510** is stripped to expose the fibers (e.g., **12** fibers) held by that sheath.

[0083] Those loose fibers **520** are routed from the basket **304** to the basket **306** as shown in FIGS. **22** and **24**. Optionally, one or more of the fibers **520** that are then routed off the basket **306** below the tray **300** toward the adapter banks **150** can be spliced to connectorized pigtails at splices held by a splice holder **147** mounted to the main body **111** at the fiber management portion **128** of the upper region **122**. Alternatively, one or more of the loose fibers **520** that are routed off the basket **306** toward the adapter blocks **150** are connectorized and not spliced to pigtails that include the connectors **52**. Either way, the connectorized fibers **520** or connectorized pigtails that have been spliced to the fibers **520** are optically connected via the adapters **152** to fibers of drop cables entering the closure at the upper region **122** of the organizer **100** and terminated at connectors **56**.

[0084] Referring to FIG. **26**, at the surface **214** of the back-to-back tray **200**, the sheaths **508** and **510** are stripped to expose the fibers **530**, **540**, therein. The fibers **530** are spliced to the fibers **540** and the splice bodies **560** are held by splice holders **228** supported at the surface **214**. In this manner, optical signals from one of the cables **500**, **502** are routed to the other cable **500**, **502** via the surface **214** of the back-to-back tray **200**.

[0085] Referring to FIG. **27**, at the surface **216** of the back-to-back tray **200**, the sheaths **508** and **510** are stripped to expose the fibers **535**, **545** therein. The fibers **535** are spliced to the fibers **545** and the splice bodies **565** are held by splice holders **580** supported at the surface **216**. In this manner, optical signals from one of the cables **500**, **502** are routed to the other cable **500**, **502** via the surface **216** of the back-to-back tray **200**.

[0086] The back-to-back nature of the tray **200** allows the tray **200** to support a large number of splices, e.g., up to 48 splices or more on either side of the tray, thereby improving the fiber management capacity of the organizer **100**.

[0087] In some examples, one or more splitters supported by the organizer **100** can split signals from a provider side fiber to a plurality of subscriber side fibers, all of which fibers are routed according to one or more of the routing configurations or portions of routing configurations using the organizer **100** and described herein. From the foregoing detailed description, it will be evident

that modifications and variations can be made in the devices of the disclosure without departing from the spirit or scope of the invention.

## Claims

**1-26**. (canceled)
**27**. A fiber management organizer for a telecommunications closure, comprising: a main body, an outer perimeter of the main body being defined by a plurality of side walls of the main body; a first fiber management tray pivotally coupled to a first of the plurality of side walls by a first hinge defining a first pivot axis, the first fiber management tray being pivotal in a first pivot direction about the first pivot axis from a first storage position to a first access position, the first pivot direction being away from the main body, the first fiber management tray including a first fiber management surface configured to support an optical fiber splice holder; and a second fiber management tray pivotally coupled to a second of the plurality of side walls by a second hinge defining a second pivot axis, the second fiber management tray being pivotal about the second pivot axis in a second pivot direction from a second storage position to a second access position, the second pivot direction being away from the main body, the second fiber management tray including a second fiber management surface and a plurality of fiber retainers configured to cooperate with the second fiber management surface to retain optical fibers in the second fiber management tray; wherein the first fiber management tray and the second fiber management tray overlap each other when the first fiber management tray is in the first storage position and the second fiber management tray is in the second storage position; wherein the first pivot direction and the second pivot direction are different from each other; and wherein the first fiber management surface and the second fiber management surface face each other when the first fiber management tray is in the first storage position and the second fiber management tray is in the second storage position.
**28**. The fiber management organizer of claim 27, wherein the first fiber management tray overlaps an entirety of the second fiber management tray when the first fiber management tray is in the first storage position and the second fiber management tray is in the second storage position.
**29**. The fiber management organizer of claim 27, wherein the first pivot direction and the second pivot direction are offset from each other by 90 degrees.
**30**. The fiber management organizer of claim 27, wherein the first pivot direction and the second pivot direction are offset from each other by 180 degrees.
**31**. The fiber management organizer of claim 27, further comprising an optical fiber.
**32**. The fiber management organizer of claim 27, wherein the second fiber management tray defines a fiber loop storage basket.
**33**. The fiber management organizer of claim 27, further comprising a module supporting a fiber optic adapter for receiving connectorized optical fibers, the module being supported by the main body.
**34**. The fiber management organizer of claim 27, wherein the first fiber management tray is a back-to-back tray.
**35**. The fiber management organizer of claim 27, wherein the first hinge includes a plurality of hinge clips, each of the plurality of hinge clips including a flexibly resilient hinge joint.
**36**. The fiber management organizer of claim 27, wherein the first hinge and the second hinge are configured differently from each other.
**37**. The fiber management organizer of claim 27, wherein the first fiber management tray includes a catch and the main body includes a flange defining an opening; and wherein the catch is configured to lockingly engage the opening when the first fiber management tray is in the first storage position.
**38**. A fiber management organizer for a telecommunications closure, comprising: a main body, an

outer perimeter of the main body being defined by a plurality of side walls of the main body; a first fiber management tray pivotally coupled to a first of the plurality of side walls by a first hinge defining a first pivot axis, the first fiber management tray being pivotal in a first pivot direction about the first pivot axis from a first storage position to a first access position, the first pivot direction being away from the main body; and a second fiber management tray pivotally coupled to a second of the plurality of side walls by a second hinge defining a second pivot axis, the second fiber management tray being pivotal about the second pivot axis in a second pivot direction from a second storage position to a second access position, the second pivot direction being away from the main body, wherein the first fiber management tray and the second fiber management tray overlap each other when the first fiber management tray is in the first storage position and the second fiber management tray is in the second storage position; wherein the first pivot direction and the second pivot direction are different from each other; wherein the first pivot direction and the second pivot direction are offset from each other by 180 degrees; wherein the first fiber management tray includes a fiber management surface supporting an optical fiber splice holder; wherein the fiber management surface faces the second fiber management tray when the first fiber management tray is in the first storage position and the second fiber management tray is in the second storage position; wherein the first fiber management tray includes a catch and the main body includes a flange defining an opening; and wherein the catch is configured to lockingly engage the opening when the first fiber management tray is in the first storage position.

**39**. The fiber management organizer of claim 38, wherein the first hinge includes a plurality of hinge clips, each of the plurality of hinge clips include a flexibly resilient hinge joint.

**40**. The fiber management organizer of claim 38, wherein the first fiber management tray overlaps an entirety of the second fiber management tray when the first fiber management tray is in the first storage position and the second fiber management tray is in the second storage position.