A cable slicer or sheath cutter is comprised of two components, each component including a main body portion, a two part disconnectable hinge mechanism serving as a coupling device at one end or side of the main body portion and a T-shaped handle disposed at an opposite end of the main body portion. The coupling device rotatably couples the two components together. A channel runs along an interior length of at least one of the main body portions, which provides a path into which the cable to be stripped is inserted. A blade housing on at least one of the components of the main body portion securely holds a blade with a predetermined amount of the tip or edge of the blade protruding into and generally perpendicular to the channel. The exposed portion of the blade slices or shaves the sheath or covering of an interior layer of the cable by a precise, predetermined amount without cutting or shaving the cable in the interior.
MID-SPAN ACCESS TOOL FOR BUFFER TUBES

CROSS-REFERENCE TO RELATED APPLICATIONS


TECHNICAL FIELD

[0002] The present invention relates to cable strippers and more particularly, relates to a two-piece cable stripper designed to shave, score or otherwise expose or penetrate a layer of a cable, such as fiber-optic cables.

BACKGROUND INFORMATION

[0003] Data conducting wires or elements, such as fiber-optic cables, are typically surrounded by an inner tube, jacket or sheath that is also surrounded by an outer jacket or sheath. The inner jacket or sheath, typically referred to as a buffer tube in a fiber optic cable, lies very close to the optical fibers. The buffer tube or internal jacket or sheath needs to be carefully opened from either the middle or the end of the cables during installation or repair. To accomplish this, a technician generally cuts through either the inner jacket or buffer tube using a tool designed for such access.

[0004] This activity, however, can be difficult and generally requires precise skill so that the delicate fiber cables are not severed or damaged. In the case of fiber optic cables, the optical fiber itself can also be damaged by excessive cable twisting, pulling or mishandling.

[0005] Accordingly, what is needed is a cable or buffer tube slicer that allows a user to easily and safely precisely shave, cut or otherwise access the inner sheath of a cable or buffer tube either at an end of a cable or at any point along the length (middle or mid-span) of a cable. The cable access tool should accommodate different sizes of cable with varying fiber counts. The cable access tool should also be able to accommodate various dimensions of cable or cable components.

SUMMARY

[0006] The present invention features a device for shaving, slitting, or cutting a layer of a cable, the device comprising a first component and a second component, each of the first and second components having a main body portion having a length, an exterior side and an interior side, a first end and a second end opposite the first end. At least one of the first and second components including at least one channel that runs along the entire length of the interior side of at least one of the first and second components. At least one blade housing, located within the main body portion of the first component, is configured for securely and removably holding at least one blade in a position generally perpendicular to the at least one channel such that at least an edge portion of the at least one blade protrudes into an interior region of the at least one channel.

[0007] The device may further include at least one channel that runs along the entire length of the interior side of both the first and second components and wherein the first component includes a flattened channel and the second component includes a rounded channel. The at least one blade may be an adjustable blade and the adjustable blade may be configured to be disposed and adjusted to variable depths. The blade housing may further include a removable portion, a fixed portion and at least one screw, wherein the at least one screw is configured to hold the at least one blade between the removable portion and the fixed portion of the blade housing.

[0008] The first and second components may be made from a material selected from the group consisting of plastic, aluminum and a composite material. The plastic material may include an acrylon polymer.

[0009] The device may further include a two part disconnectable hinge mechanism located proximate a first end of the body portion of the first and second components, a first part of the two part hinge mechanism is located on the first component and a second part of the two part hinge mechanism is located on the second component, wherein the hinge mechanism is configured to attach the first component to the second component and allow the first component and second component to rotatably couple to one another, thereby allowing the device to be positioned around said cable at any point along a length of said cable when the two part disconnectable hinge mechanism of the device is disconnected.

[0010] The device may further include an attachment mechanism located proximate a second end of the body portion of the first and second components, wherein the attachment mechanism is configured to fixably hold the first and second components together in a closed position.

[0011] The at least one channel forms a path when the first component and second component are brought into a closed position confronting one another, and wherein in one embodiment, the path that is formed has a generally oval shape designed to accept a flat fiber optic cable. In another embodiment, the path that is formed has a round shape designed to accept a round fiber optic cable. In another embodiment, the at least one channel is configured to accept an insert that includes, on one side of the insert, a channel of a desired shape and size.

[0012] The present invention features a device for cutting, slicing or shaving an interior tube within a cable, the device comprising a first component and a second component, each of the first and second components having a main body portion having a length, an exterior side, an interior side, a first end and a second end opposite the first end. Each of the first and second components include at least one channel that runs along the entire length of the interior side of the first and/or second components. The first end of the main body portion of each of the first and second components has a generally T-shaped handle. The first and second components are designed to releasably and rotatably interconnect with one another in a clam-shell arrangement such that the two components open up and away from one another and can be placed around the middle portion of a cable. The components are configured for receiving a cable in the channel in the interior side of the first and second components.

[0013] The invention also includes at least one blade housing, located on the exterior side of at least one of the first and second components within the main body portion, the at least one blade housing configured for securely and removably holding at least one blade in a position such that at least a portion of the at least one blade protrudes into the interior side of the at least one of the first and second components and at
least partially into the channel of the at least one of the first and second components on which the blade is located.

[0014] A further aspect of the device allows the first and second components to be configured for being at least partially disconnected from one another. In order to access the interior layer or sheath of the cable, the sheath or tube is inserted into the device (or the device placed around a cable or buffer tube in the case of a mid-span access) and the first and second components are brought into a closed, confronting position whereby the interior portion of the first component confronts or faces the interior portion of the second component. The device is further configured to shave, score, or cut the interior sheath of the cable when the first and second components are in a closed position and the device is advanced along a selected length of the cable.

[0015] The first and second components may be made from a plastic material. The plastic material is preferably an acetal polymer plastic material that makes it “slippery” against the jacket of the cable to be cut or scored.

[0016] An additional aspect of the present invention is the formation of a path by the upper channel of the first component and the lower channel of the second component when the first and second components are brought into a closed, confronting position against one another, wherein the second component has a lower channel with a rounded shape and the first component has at least a partial upper channel with a flattened shape.

[0017] In another embodiment of the present invention, the channel on at least one of the first and second components is configured to accept an insert that includes, on one side of the insert, a channel of a desired shape and size.

[0018] In a further embodiment of the present invention, the at least one blade housing includes a first blade housing located on the exterior side of the first component.

[0019] In an additional embodiment of the present invention, the channel in the second component further includes an opening that allows a portion of the interior sheath of the cable sliced by the at least one blade to exit the device.

[0020] In another exemplary embodiment of the present invention, the interior portion of the first and second components includes a plurality of differently sized channels that run along the entire length of the first and second components.

[0021] It is important to note that the present invention is not intended to be limited to a system or method which must satisfy one or more of any stated objects or features of the invention. It is also important to note that the present invention is not limited to the preferred, exemplary, or primary embodiment(s) described herein. Modifications and substitutions by one of ordinary skill in the art are considered to be within the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] These and other features and advantages of the present invention will be better understood by reading the following detailed description, taken together with the drawings wherein:

[0023] FIG. 1 is a perspective view of the cable sheath cutter according to a first embodiment of the present invention;

[0024] FIG. 2 is a close-up of the exterior view of the sheath cutter according to a second embodiment of the present invention;

[0025] FIG. 3 is a view of the disassembled blade housing of the sheath cutter according to a second embodiment of the present invention; and

[0026] FIG. 4 is a view of the disassembled blade housing of the sheath cutter according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] The sheath cutter 10, FIG. 1, in accordance with a first embodiment of the present invention includes a hinge portion 12 a body portion 14 and a T-shaped handle portion 16. The cutter 10 is preferably made from a relatively strong, weatherproof, durable material such as plastic, aluminum or composite material. The plastic material is preferably a smooth, high slip material that is self-lubricating, such as acetal polymer, which may be provided by Celanese Corporation, or another suitable plastic material. This type of generally “slippery” plastic material facilitates sliding the sheath cutter along the length of a cable or buffer tube to be slit. The T-shaped handle portion 16 is arranged perpendicular to the body portion 14. The body portion 14 further includes one or more blade housings 18 that hold and enclose a blade. The blade is used to penetrate the top, side and/or bottom portion(s) of a layer or sheath of a cable 11. The cable can be a fiber optic cable, a copper cable, or any other type of cable. For example, fiber optic cable often has a tougher outer jacket or sheath and a softer inner jacket or sheath (generally referred to as a buffer tube). Once the outer jacket or sheath has been opened, the inner layer jacket or sheath must be penetrated to gain access to the individual fiber optic cables located inside. The penetration can be in the form of a cut, splice, slice, or any other means of providing access to the interior region of the cable. The interior jacket or sheath is often called the buffer tube and can be made from a low density polyethylene. The hinge portion 12 allows the body portion 14 to come apart into two pieces allowing the cable stripper 10 to be placed at any point along or around a given length of cable.

[0028] The body portion 14 includes a first component 14A and a second component 14B. The second component 14B includes a lower groove or lower channel 20 and the first component 14A includes an upper groove or upper channel 21. The combination of the upper and lower channel 20/21 forms a pathway or channel through which the interior sheath will fit. The upper channel 21 located on the first component 14A may have a generally flattened shape. The lower channel 20 located on the second component 14B will typically have a rounded shape. The first and second components 14A/14B may contain one upper and lower channel or they may contain a plurality of upper and lower channels. The plurality of upper and lower channels may vary in size and shape. At least one of the upper and/or lower channels may also accept an insert (not shown) that is fitted on one side with a channel of a desired size and shape.

[0029] The hinge portion 12 is constructed and arranged such that the first component 14A is separable from the second component 14B allowing the cable stripper 10 to be placed over and around the cable 11 at any point along the cable. The first component 14A and the second component 14B can rotate from an open position (not shown) to a closed position (shown in FIG. 1). In a closed position, protrusions (not shown) on the T-shaped handle 16 of the first component 14A, if provided, will insert into the corresponding holes (not shown) on the T-shaped handle 16 of the second component
14B, if provided, and vice versa. In one embodiment, the first and second components 14A/14B may be hinged at their extremity as showed in FIG. 1, while in the preferred embodiment, they may be hinged along a side region as shown in FIGS. 2, 3 and 4.

[00030] The blade edge 30, FIG. 3, protrudes a predetermined amount within the upper channel 21 in the body portion 14 of the first component 14A of the sheath cutter 10 according to a first embodiment of the present invention. The blade edge 30 protruding into the channel only goes a predetermined amount or distance into the channel, but does not protrude beyond the top surface of the channel. As a result, the blade edge 30 is contained completely within the channel and cannot cut someone who runs their fingertip along the top surface of the body portion 14. In this embodiment of the present invention, the blade is oriented perpendicular to the cable. The blade housing (18 from FIG. 1), is constructed of two portions, including a removable portion of blade housing 28A and a fixed portion of blade housing 28B (shown in FIG. 4). The blade housing 18 is sized and shaped to accommodate a blade 30. The blade 30 is preferably a standard and readily available single edge utility blade available at hardware and department stores or a mini blade, or any other suitable blade.

In a first embodiment, one or more screws 32, 32A, 32B, etc. pass through the removable portion of the attached blade housing 28A and/or the blade itself into a corresponding threaded region in the fixed portion 28B of the blade housing (this action is shown in FIG. 4). Once the blade 30 is inserted and the removable portion of the blade housing 28A is attached to the fixed portion of the blade housing 28B, the blade 30 will be held at an angle such that only a portion of the blade edge 26 will protrude through the channel 20. The preferred angle of the blade is between approximately 10 to 45 degrees. In this aspect of the invention, the blade housing has a fixed blade.

[00031] In another aspect of the invention, the blade housing allows for an adjustable blade. The adjustable blade can operate on a pivot, with a ratchet, or by any other operable means. The adjustable blade allows the blade tip to operate at variable depths. The adjustable blade may also be a custom adjustable blade. The custom adjustable blade will provide for a plurality of blades that may be color-coded or otherwise marked to allow for easy interchangeability by a user. The custom adjustable blade allows a user to switch the blade easily to allow the user to use the same cable stripper for different cable sizes and shapes.

[00032] The sheath cutter illustrated in FIGS. 1-4 is designed to slit the top (and/or bottom) region of a layer of a cable, such as an interior layer. FIGS. 2-4 detail a second preferred embodiment of the present invention. In this embodiment of the present invention, the blade is oriented perpendicular to the cable. The cable stripper 100 includes an end portion 12, a body portion 14 and a T-shaped handle portion 16. The cable stripper 100 is preferably made from a relatively strong, weatherproof, durable material such as plastic, aluminum or composite material. The plastic material is preferably an acetyl polymer or other suitable plastic. The T-shaped handle portion 16 is arranged perpendicular to the body portion 14.

[00033] The body portion 14 further includes one blade housing 18 that holds and encloses a blade 30 and is located on the first component. The blade may be a blade, a utility blade, a mini blade, or any other suitable blade. The blade 30 is used to penetrate the interior layer or sheath of a fiber optic cable (not shown). The penetration can be in the form of a cut, splice, slice, or any other means of penetrating the interior layer of the cable to provide access to the actual cable (fibers) inside. The blade edge 30 protrudes perpendicular to a cable a predetermined amount within an upper channel 21 in the body portion 14 of the first component 14A of the sheath cutter 100. The blade housing 18 is constructed of a removable portion of blade housing 28A, a fixed portion of blade housing 28B, and one or more screws 32. Preferably the blade is held by a first screw 32A and a second screw 32B. The blade housing is sized and shaped to accommodate the blade 30. One or more screws 32, 32A, 32B, etc. pass through the removable portion of blade housing 28A and/or the blade 30 into a corresponding fixed portion of blade housing 28B that contains a threaded region in the blade housing 18. Once the blade 30 is secured, the blade 30 will be held at an angle perpendicular to the channel. The preferred angle of the blade is between approximately 10 to 45 degrees. In this aspect of the invention, the blade housing uses a fixed blade.

[00034] In another aspect of the invention, the blade housing allows for an adjustable blade. The adjustable blade can operate on a pivot, with a ratchet, or by any other operable means. The adjustable blade allows the blade edge to operate at variable depths. The adjustable blade may also be a custom adjustable blade. The custom adjustable blade will provide for a plurality of blades that may be color-coded or otherwise marked to allow for easy interchangeability by a user. The custom adjustable blade allows a user to switch the blade easily to allow the user to use the same cable stripper for different cable sizes and shapes.

[00035] The body portion 14, includes a first component 14A and a second component 14B. The first and second components 14A/14B may each include one or more upper grooves or upper channels 21 and one or more lower grooves or lower channels 20. The upper channel 21 in combination with a lower channel 20 forms a pathway into which the cable will fit. The upper channel 21 is located on the first component 14A and will preferably have a flattened shape. The lower channel 20 is located on the second component 14B and preferably has a rounded shape. The first and second components 14A/14B may contain one channel or they may contain a plurality of channels (as shown in FIGS. 3 and 4). For example, the first component 14A may have one channel and the second component 14B may have two or more channels. Alternatively, one of the components may not contain a channel. The plurality of channels may vary in their size and shape. The channels of either one or both of the first and second components can also accept an insert (not shown) that is fitted on one side with a channel of a desired size and shape. Each T-shaped handle portion 16 may also include a protrusion (not shown), which is sized and shaped to fit into a hole (not shown) in the corresponding, opposite position in the other half of the T-shaped handle portion 16, which helps lock the two handles together. The second component 14B may be outfitted with one or more openings (not shown) that allow a portion of the interior layer (jacket or sheath) of the cable that has been sliced off by blade 30 to exit the cable stripper 100.

[00036] In the second embodiment of the present invention, the first component 14A and the second component 14B are connected to one another via a hinge mechanism 40 located on the sides of both the first and second components 14A/14B. The hinge mechanism 40 allows the cable stripper 100 to open within the body portion 14 of the cable stripper 100 (as shown in FIG. 3) and allows the first and second components 14A/14B to be attached and rotatably coupled to one another.
A cable or sheath can be inserted at any point into the cable stripper 50 when the stripper is in an open position. The cable stripper can then be closed by bringing the first component 14A towards the second component 14B. This allows a user to score the interior layer of a cable at a midpoint section of the cable. The hinge mechanism 40 is located on a first half 44 of the body portion 14 of the first and second components 14A/14B and a latch or an attachment mechanism 42 is located on a second half 46 of the body portion 14 of the first and second components 14A/14B. The attachment mechanism 42 is a locking feature that holds the first and second components together.

Another feature of the present invention is the provision of a plurality of sizing slots or notches 48 which serve to allow the user to determine which channel 20 to use to actually slice or score the table or buffer to. A user will first determine which channel 20 is the appropriate size for the current cable or buffer to be accessed utilizing the sizing notches 48. The user can be sure that the desired amount of cable or buffer tube is removed to provide access to the inside of the cable or tube without removing too much, which would potentially damage the fiber optic cables or fiber wires inside the cable or tube.

Accordingly, the present invention provides a novel cable or buffer tube slicer that allows a user to easily, safely and precisely shave, cut or otherwise access the inner sheath of a cable or buffer tube either at an end of a cable or at any point along the length (middle or mid-span) of a cable while also accommodating different sizes or dimensions of cable or cable components with varying fiber counts.

The present invention is not to be limited by any preferred or exemplary embodiments or features disclosed herein. Modifications and substitutions by one of ordinary skill in the art are considered to be within the scope of the present invention, which is not to be limited except by the allowed claims and their legal equivalents.

The invention claimed is:

1. A device for shaving, slitting, or cutting a layer of a cable, the device comprising:
   a first component and a second component, each of the first and second components having a main body portion having a length, an exterior side and an interior side, a first end and a second end opposite the first end;
   at least one of the first and second components including at least one channel that runs along the entire length of the interior side of at least one of the first and second components;
   and
   at least one blade housing, located within the main body portion of the first component, the at least one blade housing configured to securely and removably holding at least one blade in a position generally perpendicular to the at least one channel such that at least an edge portion of the at least one blade protrudes into an interior region of the at least one channel.

2. The device of claim 1, wherein the at least one channel runs along the entire length of the interior side of both the first and second components and wherein the first component includes a flattened channel and the second component includes a rounded channel.

3. The device of claim 1, wherein the at least one blade is an adjustable blade and the adjustable blade is configured to be disposed at variable depths.

4. The device of claim 1, wherein the blade housing further includes a removable portion, a fixed portion and at least one screw, wherein the at least one screw is configured to hold the at least one blade between the removable portion and the fixed portion of the blade housing.

5. The device of claim 1, wherein the first and second components are made from a material selected from the group consisting of plastic, aluminum and a composite material.

6. The device of claim 5, wherein the plastic material is an acetyl polymer.

7. The device of claim 1, further including a part disconnectable hinge mechanism located proximate a first end of said body portion of said first and second components, a first part of said two part hinge mechanism located on the first component and a second part of said two part hinge mechanism located on the second component, wherein the hinge mechanism is configured to attach the first component to the second component and allow the first component and second component to rotatably couple to one another, thereby allowing the device to be positioned around said cable at any point along a length of said cable when the two part disconnectable hinge mechanism of said device is disconnected.

8. The device of claim 7, further including an attachment mechanism located proximate a second end of the body portion of the first and second components, wherein the attachment mechanism is configured to fixably hold the first and second components together in a closed position.

9. The device of claim 1, wherein the at least one channel forms a path when the first component and second component are brought into a closed position confronting one another, and wherein the path that is formed has a generally oval shape designed to accept a round fiber optic cable.

10. The device of claim 1, wherein the at least one channel forms a path when the first component and second component are brought into a closed position confronting one another, and wherein the path that is formed has a round shape designed to accept a flat fiber optic cable.

11. The device of claim 1, wherein the at least one channel is configured to accept an insert that includes, on one side of the insert, a channel of a desired shape and size.

12. A device for cutting or scoring a layer of a cable, the device comprising:
   a first component and a second component, each of the first and second components having a main body portion having a length, a first portion and a second portion, an exterior side and an interior side, a first end and a second end opposite the first end;
   each of the first and second components including at least one channel that runs along generally the entire length of the interior side of the first and second components;
   a two part disconnectable hinge mechanism located proximate a first end of said body portion of said first and second components, a first part of said two part hinge mechanism located on the first component and a second part of said two part hinge mechanism located on the second component, wherein the hinge mechanism is configured to attach the first component to the second component and allow the first component and second component to rotatably couple to one another, thereby allowing the device to be positioned around said cable at any point along a length of said cable when the two part disconnectable hinge mechanism of said device is disconnected; and
   at least one blade housing, located within the main body portion of the first component.
13. The device of claim 12, wherein the at least one blade housing comprises a removable portion, a fixed portion, at least one blade and at least one screw, wherein the at least one screw is configured to securely hold the at least one blade between the removable portion and the fixed portion in a position perpendicular to the at least one channel such that at least an edge portion of the at least one blade protrudes into the interior region of the at least one channel.

14. The device of claim 13, wherein the at least one blade is an adjustable blade, and wherein the adjustable blade is configured to operate at variable depths.

15. The device of claim 12, further comprising a plurality of notches, wherein the notches are configured to allow a user to determine which of the at least one channels are the appropriate size prior to cutting or scoring a cable.

16. The device of claim 12, further including an attachment mechanism, which is located on a second half of the body portion of the first and second components, wherein the attachment mechanism is configured to fixably hold the first and second components together in a closed position.

17. The device of claim 16, wherein the attachment mechanism further includes a locking feature that securely locks the first and second components together.

18. The device of claim 12, wherein the at least one channel is formed by an upper portion of the channel located on the first component and a lower portion of the channel located on the second component.

19. The device of claim 18, wherein the upper portion of the channel has a flattened shape and the lower portion of the channel has a rounded shape.

20. The device of claim 12, wherein the device features a plurality of channels and at least one of said plurality of channels is configured to accept an insert that includes, on one side of the insert, a channel of a desired shape and size.

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