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(54) Title: BLADELESS STRIPPING DEVICE

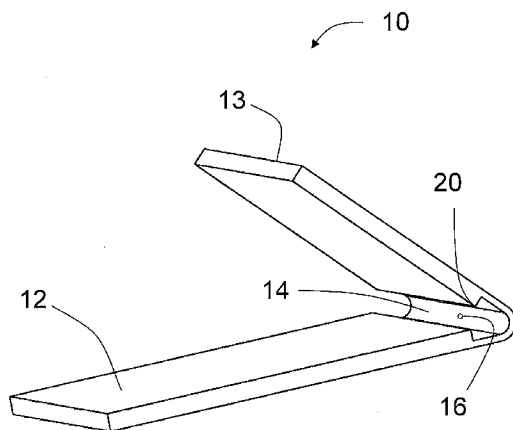


FIG. 1

(57) Abstract: A bladeless stripping device includes a body having a cutting zone across the body forming a living hinge to fold the body along a fold area. An aperture may be located through the body and may be associated with the fold area. The aperture may change dimension as the body is folded and unfolded. The fiber aperture may receive for example an optical fiber in an unfolded state and may close upon for example the optical fiber in a folded state such that, when the bladeless stripping device is translated along for example the optical fiber at least one coating of for example the optical fiber is caused to be stripped away, revealing for example a bare glass fiber suitable, for example, for connectorizing or splicing.



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BLADELESS STRIPPING DEVICE

BACKGROUND

[0001] *Related Applications*

[0002] This application claims the benefit of priority under 35 U.S.C. § 120 of U.S. Application Serial No. 13/077,363 filed on March 31, 2011 the content of which is relied upon and incorporated herein by reference in its entirety.

[0003] *Field of the Disclosure*

[0004] The disclosure relates generally to a stripping device and more particularly to a bladeless stripping device which may be used to strip at least one coating from an optical element.

[0005] *Technical Field*

[0006] In the field of fiber optics, glass optical fiber is usually coated with several layers of such protective material as plastics, acrylates to enhance optical qualities, tensile strength and handling characteristics. Such coatings must be removed in order to process the optical fiber; for example, splicing two fibers together or attaching a connector to the fiber. As an example, 900um buffered optical fiber is usually stripped to the glass surface by the use of stripping tools that incorporate multiple moving parts. The tools are usually held in the hands of the fiber installers and are used to cut away and discard one or more protective buffer layers to expose glass fiber underneath for splicing and connectorizing, requiring time consuming training and practice to operate effectively. Such tools can be expensive and may take at least two passes to remove the buffer and coating, and are typically made from a combination of metal and plastics and resemble copper wire strippers in their appearance and action. These tools may sometimes nick, scratch, or otherwise damage the surface of the optical fiber while removing the coating, creating stress points that may weaken the fiber and causing attenuation events. Additionally, these tools do not provide much tactile feedback to the operator as to when the buffer and more pertinently the coating has been sufficiently removed.

[0007] A polymer stripping device is needed that has only one part, reduces the risk of damaging the glass fiber, is inexpensive to manufacture and easy to use.

SUMMARY

[0008] One embodiment of the disclosure relates to a stripping device made from a polymer for removing at least one coating from an optical element, for example, an optical fiber, the stripping device including a body, at least one cutting zone across the body and at least one aperture through the body. The body may have a length, a width and a first thickness, the length defining a first axis and the width defining a second axis. The at least one cutting zone across the body may lie along the second axis and may have a second thickness, forming a hinge defining a fold area for folding the body from a substantially unfolded configuration to a substantially folded configuration. The at least one aperture may receive at least one optical element, and may be associated with the fold area. The aperture may have a first aperture width that changes as the body is folded.

[0009] The first aperture width may be from about 900 microns (μm) to about 1000 μm along the first axis. The first aperture width may change to a second aperture width when the body is folded. The second aperture width may be less than the first aperture width. Specifically, the second aperture width may be from about 50 μm to about 200 μm . More specifically, the second aperture width may be from about 100 μm to about 150 μm . Still more specifically, the second aperture width may be from about 80 μm to about 125 μm .

[0010] Additionally, the at least one aperture may be at least one through-hole or through-slot, and also may be an array of through-holes or through slots.

[0011] The stripping device may also include opposing wiping feature associated with the cutting zone. The opposing wiping features may be configured to change distance from one another during folding of the stripping device and may ensure the coatings are removed from the optical element by pinching down on the optical element directly behind the aperture.

[0012] A method is provided for using the stripping device to remove coatings from an optical element, for example, an optical fiber. The method may include providing a optical element, providing a stripping device, holding the stripping device in a substantially unfolded configuration and substantially perpendicular to the optical element, and inserting an end of the optical element through the aperture for a distance, the distance at least as long as the length of coating to be removed.

[0013] The method also may include folding the stripping device along the fold area into a substantially folded configuration, causing the aperture to change from a first aperture width to a second aperture width, the second aperture width being at least as small as the optical

element, causing at least a portion of an edge of the aperture to perforate the optical element coating, pushing the folded stripping device along the optical element toward the end of the optical element while maintaining the folded configuration, causing the optical element coating ahead of the folded stripping device to break free from the optical element and slide axially along the optical element.

[0014] Additional features and advantages will be set forth in the detailed description which follows, and in part will be readily apparent to those skilled in the art from the description or recognized by practicing the embodiments as described in the written description and claims hereof, as well as the appended drawings.

[0015] It is to be understood that both the foregoing general description and the following detailed description are merely exemplary, and are intended to provide an overview or framework to understand the nature and character of the claims.

[0016] The accompanying drawings are included to provide a further understanding, and are incorporated in and constitute a part of this specification. The drawings illustrate one or more embodiments, and together with the description serve to explain principles and operation of the various embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0017] FIG. 1 is a perspective view of a stripping device in a partially folded configuration;
- [0018] FIG. 2 is a top view of the stripping device of FIG. 1;
- [0019] FIG. 3 is a side cutaway view of the stripping device of FIG. 2;
- [0020] FIGS. 4A-4D are alternate embodiments of the stripping device of FIGS. 1-3;
- [0021] FIG. 5 is a perspective view of a row of stripping devices, configured for easy packaging;
- [0022] FIG. 6 is a perspective view of a sheet of stripping devices, configured for easy packaging;
- [0023] FIG. 7 is a perspective view of a folded stack of stripping devices, configured for easy packaging;
- [0024] FIG. 8 is a side view of the stripping device of FIG. 3 prepared to receive an optical element;
- [0025] FIG. 9 is a side view of the stripping device of FIG. 3 having received an optical element;
- [0026] FIG. 10 is a close up cutaway view of the stripping device having received an optical element, the stripping device in a partially folded configuration;
- [0027] FIG. 11 is a perspective side view of the stripping device having received an optical element, the stripping device in a partially folded configuration;
- [0028] FIG. 12 is a cutaway side view of the stripping device having received an optical element, the stripping device having an increased folded configuration;
- [0029] FIG. 13 is a cutaway side view of the stripping device having received an optical element, the stripping device having an even more increased folded configuration, the optical element being partially stripped of at least one coating;
- [0030] FIG. 14 is a cutaway side view of the stripping device after stripping at least one coating from the optical element;
- [0031] FIG. 15A is a cutaway detail of part of the side cutaway view of the stripping device of FIG. 3 showing the aperture;
- [0032] FIG. 15B is a cutaway detail of part of the side view of the stripping device of FIG. 14 showing a change in the dimension of the aperture while in the folded configuration;

[0033] FIG. 16 is a side cutaway view of the stripping device in a fully closed configuration;

[0034] FIGS. 17 and 18 are two different views of exemplary embodiments of the stripping device having tactile features for pushing and pulling; and

[0035] FIG. 19 is a perspective view of an exemplary embodiment of the stripping device having a latching feature.

DETAILED DESCRIPTION

[0036] Reference is now made in detail to the present embodiments of the disclosure, examples of which are illustrated in the accompanying drawings. Whenever possible, identical or similar reference numerals are used throughout the drawings to refer to identical or similar parts. It should be understood that the embodiments disclosed herein are merely examples with each one incorporating certain benefits of the present disclosure. Various modifications and alterations may be made to the following examples within the scope of the present disclosure, and aspects of the different examples may be mixed in different ways to achieve yet further examples. Accordingly, the true scope of the disclosure is to be understood from the entirety of the present disclosure in view of, but not limited to the embodiments described herein.

[0037] A stripping device is disclosed that may strip a portion of at least one coating from an optical element. Specifically, a bladeless stripping device is disclosed that may strip a portion of at least one coating from, for example, an optical fiber, exposing, for example, a portion of a bare glass fiber suitable, for example, for connectorizing or splicing. The stripping device may be, for example, a self contained stripping device having a single part, requiring no additional parts, e.g., blades, to operate effectively to remove the at least one coating from the optical element.

[0038] Various embodiments will be further clarified by the following examples.

[0039] An exemplary stripping device **10** may include a body, the body having a first lever arm **12** and a second lever arm **13**, at least one cutting zone **11** substantially across body and at least one aperture **16** through the body (**FIGS. 1-3**). The body may include a length *L* defining a first axis, a width *W* defining a second axis and a first thickness *T1*. In exemplary embodiments, length *L* may be larger than width *W*; for example, length *L* may be from 1.0 to 4.0 times larger than width *W*. In exemplary embodiments, cutting zone **11** may be located on front **17** and substantially along the second axis, and may be selected from a channel, a groove, a rut, etc. However, cutting zone **11** may be located along the body at an alternate location, for example, along the first axis, without straying from the spirit of this disclosure. In exemplary embodiments, the body may define a fold area **14**. Fold area **14** may include, for example, a fold line **15**, such as a notch or a groove, to enhance the ability of stripping device **10** to be folded. For purposes of this disclosure, “fold area” is defined as a region where a preference for bending exists on the body, for example, along cutting zone **11**.

Cutting zone **11** may have a second thickness T2 along at least a portion of cutting zone **11**. Cutting zone **11**, alone or with fold area **14**, may exemplify a hinge, for example, a living hinge.

[0040] In exemplary embodiments, stripping device **10** may also include at least one aperture **16**. Aperture **16** may, for example, be a single through-hole suitable for receiving a single optical element. In some embodiments, aperture **16** may include, for example, an array of through-holes. In alternate embodiments, aperture **16** may be a through-slot suitable, for example, for receiving an array of optical elements, for example, simultaneously. In exemplary embodiments, aperture **16** may be associated with, e.g., pass through, fold area **14** and have a first aperture width **D1** (see **FIG. 15A**) at least at the interface of aperture **16** and cutting zone **11**. Width **D1** may be any width suitable to receive a desired optical element, for example, an optical fiber. In exemplary embodiments, width **D1** may be from about 1000 microns (μm) to about 900 μm when stripping device **10** is in a substantially unfolded configuration. However, when stripping device **10** changes from a partially folded to a fully folded configuration, width **D1** may change incrementally during folding to a second aperture width **D2** (see **FIG. 8B**). In exemplary embodiments, width **D2** may be, for example, from about 50 μm to about 200 μm . In further exemplary embodiments, width **D2** may be, for example, from about 100 μm to about 150 μm . In yet further exemplary embodiments, width **D2** may be, for example, from about 80 μm to about 125 μm .

[0041] Cutting zone **11** may be associated with at least one wiping feature **20** (**FIGS. 1-3**). Wiping feature **20** may delineate opposing boundaries of cutting zone **11**, for example, perpendicular to the first axis of stripping device **10**. In an exemplary embodiment, wiping feature **20** may be substantially angular, such as in a right angle, for example. Alternate stripping device embodiments **30**, **40**, **50** and **60** may have alternate wiping features **22**, **24**, **26**, and **28**, respectively, having alternate shapes (**FIGS. 4A-4D**). The surface of cutting zone **11** of stripping device **10** may have a substantially unfolded profile and be substantially parallel to back **18** in an unfolded configuration. Alternate embodiments may have cutting zones **34**, **44**, **54** and **64**, respectively, having, for example, curved profiles. For purposes of this disclosure, stripping device **10** and the features associated with stripping device **10** will be used to exemplify the stripping devices of this disclosure.

[0042] In exemplary embodiments, when stripping device **10** is in a substantially unfolded configuration the straight line distance from each of opposing wiping features **20** may be, for example, as much as the distance across cutting zone **11**. However, when stripping device **10**

is partially or fully folded that distance may change incrementally to a smaller wiping feature distance, **D4** (see **FIG. 15B**). Distance **D4** may be, for example, as small as about 0.0 μ m (touching) when stripping device **10** is in a fully folded configuration.

[0043] In exemplary embodiments, stripping device **10** may be, for example, a self contained stripping device, for example, a single part, requiring no additional parts, for example, discrete blades, to operate effectively to remove at least one coating from an optical element. In exemplary embodiments, stripping device **10** may be made from, as an example, a thermoplastic polymer, for example, such a thermoplastic polymer as ULTEM®, available from SABIC Innovative Plastics, Pittsfield, MA, and may be made using, for example, an injection molding manufacturing process. However, any suitable material may be used that may contact the optical element while at the same time not the surface of the optical element.

[0044] Stripping device **10** may be manufactured as, for example, a single device or may be mass produced and packaged as multiple devices (**FIGS. 5-7**). A strip **100** (**FIG. 5**) of linearly interconnected stripping devices **110** may be connected by, for example, a weakened area **102**. In exemplary embodiments weakened area **102** may be, for example, a tearable or breakable tab **104**. In other exemplary embodiments, weakened area may be a pinched area, suitable for tearing or breaking, demarcating individual stripping devices **110**. In further embodiments, a sheet **200** (**FIG. 6**) may include multiple strips **100** of stripping devices **110**. Strips **100** may be conjoined by such a weakened area as area **220**, similar to weakened area **102**. In yet further embodiments, stripping devices **10** may be packed as a folded stack **300** (**FIG. 7**), including multiple stripping devices **310** interconnected by a foldable area **302**. Foldable area **302** may be, for example, a living hinge. Other mass production and packaging embodiments such as rolls may also be contemplated.

[0045] In exemplary operation, an optical element **70** (**FIG. 8**) having at least one coating to be removed may have an end of the optical element inserted into aperture **16** of provided stripping device **10**. Optical elements may include an upcoated optical fiber, such as a tight buffered optical fiber. The tight buffered optical fiber may include a core, a cladding, the cladding surrounding the core, and at least one coating, the at least one coating surrounding the cladding; an upcoating, the upcoating being, for example, a radiation curable material that surrounds the optical fiber, the upcoating being strippable from the optical fiber; and a slip layer, the slip layer being disposed between the optical fiber and the upcoating, the slip layer including, for example, a micronized poly-tetra-fluoro-ethylene (PTFE), a silicone, and a dispersing agent, and the slip layer may have an uncured viscosity of about 500 centipoise or

greater, a modulus of about 500 MPa or greater, and a tensile strength of about 20 MPa or greater measured using ASTM D638, wherein a surface tension of the slip layer may be lower than a surface tension of the upcoating, thereby creating a relatively low-adhesion between the upcoating and the slip layer. Optical elements may also include such a buffered optical fiber as a loose buffered optical fiber, having at least an optical fiber with at least a 900 μm polyethylene tube. Optical element coatings to be removed may include, but are not limited to: plastics, such as tight buffered coatings on optical elements, loose buffered coatings on optical fibers; acrylate coatings on optical fibers; glass cladding material on optical fibers; or combinations thereof.

[0046] With stripping device **10A** (FIGS. 8 and 9) held in a substantially unfolded configuration and substantially perpendicular to fiber **70**, fiber **70** may be axially pushed or pulled through aperture **16** for a distance, for example, at least as long as the length of coating to be removed. Optical element **70** may be inserted from front **17** or back **18**, and in exemplary embodiments may be inserted from front **17**. Once optical element **70** is inserted, stripping device **10A** may be folded in either direction to begin engaging optical element **70** (FIGS. 10 and 11), and in exemplary embodiments maybe folded toward the front **17**. In exemplary embodiments, initial width **D1** of aperture **16** is very close in size to the optical element to be stripped. At a first angle **A1**, for example, the relative inside angle between first lever arm **12** and second lever arm **13** the edges of aperture **16** may make contact with optical element **70**, changing the shape of aperture **16** to a new shape, aperture **16'** (FIG. 10). Angle **A1** may be from, for example, up to about 180 degrees, about 180 degrees to about 90 degrees, such as from about 180 degrees to about 160 degrees, and in exemplary embodiments such as about 180 degrees to about 170 degrees, and in exemplary embodiments such as about 180 degrees to about 175 degrees. At such an angle **A1**, initial contact may begin, for example, the process of impinging one or more coatings on, for example, optical element **70**.

[0047] During folding, aperture **16'** may fully impinge the coatings on optical element **70** at an angle **A2**, changing the shape of aperture **16'** to another new shape, aperture **16''** (FIG. 12). Angle **A2** may be from, for example, about 180 degrees to about 10 degrees, such as from about 90 degrees to about 10 degrees, and in exemplary embodiments such as about 45 degrees to about 10 degrees. Folding stripping device **10** along, for example, fold area **14** into a substantially folded configuration may cause aperture **16** to change shape, resulting in a portion of aperture **16** changing from first aperture width **D1** to a second aperture width **D2**,

which may be smaller than the width of optical element **70** within aperture **16**. Also, another portion of aperture **16** may change from first aperture width **D1** to a third aperture width **D3** (see **FIG. 15B**), third aperture width **D3** being larger than first aperture width **D1**. In an exemplary embodiment, third aperture width **D3** may be from, for example, about 1000 microns (μm) to about 2000 μm . At least a portion of opposite edges of aperture **16''** along, for example, the first axis having second aperture width **D2** may then impinge, or perforate, at least one optical element coating on the optical element, and in exemplary embodiments may perforate multiple optical element coatings. In exemplary embodiments, portions of aperture **16** may change gradually from width **D1** to widths **D2** and **D3** during folding. Width **D2** may be any final width suitable to perforate one or more optical element coatings sufficiently to be compromised and removable around optical element **70**. Width **D3** may provide, for example, a pushing wall or bell shaped scraping device to further assist with coating removal.

[0048] Stripping device **10A** may be further folded to angle **A3**, for example, an angle that causes wiping features **20** to be substantially close together, such as almost or actually touching (**FIG. 13**). Angle **A3** may be from, for example, about 90 degrees to about 10 degrees, such as from about 45 degrees to about 10 degrees, and in exemplary embodiments such as about 20 degrees to about 5 degrees. When folded to, for example, angle **A3**, aperture **16''** may change shape to yet another new shape, aperture **16'''**.

[0049] In exemplary embodiments, stripping devices **400** and **500** may include a tactile aid feature, such as a pushing feature **420** on stripping device **400** (see **FIG. 17**) and a pulling feature **520** on stripping device **500** (see **FIG. 18**). Stripping device **10A** may be translated, for example, by pulling or pushing stripping devices **10**, **10A**, **110**, **310**, **400**, **500** axially, for example, by hand or by an apparatus, along, for example, optical element **70** while being held in a substantially folded position, causing the coatings to separate axially along the optical element **70** for removal.

[0050] In an exemplary embodiment, stripping devices **10**, **10A**, **110**, **310**, **400**, **500** may be substantially fully folded to an angle **A4**. Such stripping devices **10**, **10A**, **110**, **310**, **400**, **500** may include a latching feature, for example a latch arm **620** and a latch receiver **622** for locking stripping devices **10**, **10A**, **110**, **310**, **400**, **500** in a substantially closed position (**FIG. 19**). Fully closing stripping devices **10**, **10A**, **110**, **310**, **400**, **500** may provide, for example, additional wiping to further assist wiping features **20**.

[0051] By securing optical element **70** relative to stripping device **10**, stripping device **10** may be pushed axially along optical element **70** toward the end of optical element **70** while maintaining the folded configuration. In exemplary embodiments, a force of from about 1 pounds (lbs) to about 10lbs, and more specifically from about 2 lbs to about 5lbs, may be generated while translating stripping device **10** along optical element **70**. Translating stripping device **10** along optical element **70** may cause the optical element coating to break free from the optical element and to slide axially along the optical element ahead of aperture **16** until the coating is removed (**FIG. 13**), exposing a length of the optical element **72** beneath the coatings. In exemplary embodiments, pressure may be applied, for example, by an operator's fingers, to stripping device **10** near cutting zone **11** and aperture **16** while translating stripping device **10** axially along optical element **70**.

[0052] Additionally, opposing wiping features **20** may provide a secondary stripping operation, helping to ensure a clean strip using only a single pass. While in the fully folded configuration, wiping features **20** may also encounter optical element **70**. During translation, the stripping action of aperture **16** may be assisted by a pinching force of opposing wiping features **20** directly behind aperture **16**, ensuring that any coating material inadvertently left by aperture **16** will be removed by opposing wiping features **20**. The pinching force may be enhanced, for example, by the applied finger pressure.

[0053] Additionally, strippers **10, 10A, 110, 310, 400, 500** may include an array of through-holes for receiving multiple optical elements, for example, individually. Also, strippers **10, 10A, 110, 310, 400, 500** may include at least one through-slot, the at least one through-slot being an aperture adapted for receiving an array of optical elements, for example a ribbon of optical elements, within the same aperture.

[0054] Unless otherwise expressly stated, it is in no way intended that any method set forth herein be construed as requiring that its steps be performed in a specific order. Accordingly, where a method claim does not actually recite an order to be followed by its steps or it is not otherwise specifically stated in the claims or descriptions that the steps are to be limited to a specific order, it is no way intended that any particular order be inferred.

It will be apparent to those skilled in the art that various modifications and variations can be made without departing from the spirit or scope of the disclosure. Since modifications combinations, sub-combinations and variations of the disclosed embodiments incorporating the spirit and substance of the disclosure may occur to persons skilled in the art, the disclosure should be construed to include everything within the scope of the appended

claims and their equivalents.

What is claimed is:

1. A stripping device for stripping at least one coating from an optical element, the device comprising:
 - a body, the body having a length, a width and a first thickness, the length defining a first axis and the width defining a second axis;
 - at least one cutting zone across a surface of the body, the cutting zone having a second thickness, the cutting zone comprising at least one hinge defining a fold area for folding the body from a substantially unfolded configuration to a substantially folded configuration; and
 - at least one aperture for receiving at least one optical element, the aperture associated with the fold area, the aperture having a first aperture width that changes as the body is folded, for stripping at least one coating from the at least one optical element.
2. The device of claim 1, further including at least one wiping feature.
3. The device of claim 2, the at least one wiping feature being opposing wiping features associated with the cutting zone, the opposing wiping features separated by a distance across the cutting zone, the distance across the cutting zone changeable during folding of the stripping device.
4. The device of claim 1, the body including at least a first lever arm and a second lever arm for folding the body, the lever arms associated with the cutting zone.
5. The device of claim 4, the first lever arm and the second lever arm having a first angular distance up to about 180 degrees.
6. The device of claim 5, the first lever arm and the second lever arm moveable relative to each other to a second angular distance that is less than the first angular distance.
7. The device of claim 1, the first aperture width being from about 900 μ m to about 1000 μ m along the first axis.

8. The device of claim 7, the first aperture width changing to a second aperture width when the body is folded along the fold area, the second aperture width being less than the first aperture width.
9. The device of claim 8, the second aperture width being from about 50 μ m to about 200 μ m.
10. The device of claim 8, the second aperture width being from about 100 μ m to about 150 μ m.
11. The device of claim 8, the second aperture width being from about 80 μ m to about 125 μ m.
12. The device of claim 1, the at least one aperture being at least one through-hole, the through-hole changing shape as the body is folded from a substantially unfolded configuration to a substantially folded configuration.
13. The device of claim 12, the at least one aperture being an array of through-holes.
14. The device of claim 1, the at least one aperture being at least one through-slot, the at least one through-slot being adapted for receiving an array of optical elements.
15. The device of claim 1, the optical element being an optical fiber, the optical fiber including at least one glass core and at least one coating around the glass core, the coating including an annular cladding.
16. The device of claim 15, the optical element being an optical cable, the optical cable including at least one optical fiber and at least one coating around the optical fiber, the coating including a polymer coating.
17. The device of claim 1, the stripping device including a latch feature for locking the stripping device in a substantially folded configuration.

18. The device of claim 1, the stripping device comprising a single part.
19. The device of claim 1, the stripping device made from a polymer.
20. The device of any one of claims 1 - 19, the stripping device comprising an array of stripping devices joined together, the stripping devices being conjoined stripping devices separable from each other along at least one separation feature.
21. A stripping device assembly, comprising:
a plurality of stripping devices, the plurality of stripping devices comprising an array of conjoined stripping devices, the conjoined stripping devices being separable from each other along at least one separation feature, each conjoined stripping device comprising:
a body, the body having a length, a width and a first thickness, the length defining a first axis and the width defining a second axis;
at least one cutting zone across a surface of the body, the cutting zone having a second thickness, the cutting zone comprising at least one hinge defining a fold area for folding the body from a substantially unfolded configuration to a substantially folded configuration; and
at least one aperture for receiving at least one optical element, the aperture associated with the fold area, the aperture having a first aperture width that changes as the body is folded, for stripping at least one coating from the at least one optical element.
22. The assembly of claim 21, the body including at least a first lever arm and a second lever arm for folding the body, the lever arms associated with the cutting zone.
23. The assembly of claim 22, the first lever arm and the second lever arm having a first angular distance up to about 180 degrees.
24. The assembly of claim 22, the first lever arm and the second lever arm moveable relative to each other to a second angular distance from about 0 degrees to about 90 degrees.
25. The assembly of claim 21, the first aperture width being from about 900 μ m to about 1000 μ m along the first axis.

26. The assembly of claim 21, the first aperture width changing to a second aperture width when the body is folded along the fold area, the second aperture width being less than the first aperture width.
27. The assembly of claim 26, the second aperture width being from about 50 μ m to about 200 μ m.
28. The assembly of claim 26, the second aperture width being from about 100 μ m to about 150 μ m.
29. The assembly of claim 26, the second aperture width being from about 80 μ m to about 125 μ m.
30. The assembly of claim 21, the at least one aperture being at least one through-hole, the through-hole changing shape as the body is folded from a substantially unfolded configuration to a substantially folded configuration.
31. The assembly of claim 30, the at least one aperture being an array of through-holes.
32. The assembly of claim 21, the at least one aperture being at least one through-slot, the at least one through-slot being adapted for receiving an array of optical elements.
33. The assembly of claim 21, the optical element being an optical fiber, the optical fiber including at least one glass core and at least one coating around the glass core, the coating including at least an annular cladding.
34. The assembly of any one of claims 21 and 33, the optical element being an optical cable, the optical cable including at least one optical fiber and at least one coating around the optical fiber, the coating including at least a polymer coating.

35. The assembly of claim 21, each conjoined stripping device further including opposing wiping features associated with the cutting zone, the opposing wiping features configured to change distance from one another during folding of the stripping assembly.
36. The assembly of claim 21, each conjoined stripping device including a latch feature for locking the stripping device in a substantially folded configuration.
37. The assembly of claim 21, the array of conjoined stripping devices comprising a row of at least two conjoined stripping devices.
38. The assembly of any one of claims 35 - 37, the array of conjoined stripping devices comprising a sheet of at least two conjoined rows of conjoined stripping devices.
39. A method for removing coatings from an optical element, the method comprising:
providing an optical element, the optical element having at least one coating thereon;
providing a stripping device adapted for folding, the stripping device comprising a body having at least one cutting zone across the body defining a fold area with an aperture having a first aperture width, the aperture associated with the fold area;
holding the stripping device in a substantially unfolded configuration and substantially perpendicular to the optical element;
inserting an end of the optical element through the aperture for a distance, the distance at least as long as the length of coating to be removed;
folding the stripping device along the fold area into a substantially folded configuration, causing the aperture to change from a first aperture width to a second aperture width, the second aperture width being at least as small as the optical element, causing at least a portion of an edge of the aperture to perforate the optical element coating; and
translating the folded stripping device along the optical element toward the end of the optical element while maintaining the folded configuration, causing the optical element coating ahead of the folded stripping device to break free from the optical element and slide axially along the optical element.
40. The method of claim 39, the optical element being an optical fiber.

41. The method of claim 39, the stripping device including opposing wiping features associated with the at least one cutting zone.
42. The method of claim 41, further including the step of pinching the optical element with the opposing wiping features.
43. The method of claim 39, the stripping device including a latch feature.
44. The method of claim 43, further including the step of locking the stripping device with the latching feature into the substantially folded configuration.
45. The method of claim 39, including the step of independently securing the optical element and the stripping device relative to each other.
46. The method of claim 45, including the step of pulling the optical element out of the stripping device while the stripping device remains substantially stationary.
47. The method of claim 45, including the step of pulling the optical element out of the stripping device while the stripping device is pushed along the optical element at about the same time.
48. The method of claim 45, including the step of pushing the stripping device along the optical element while the optical element remains substantially stationary.

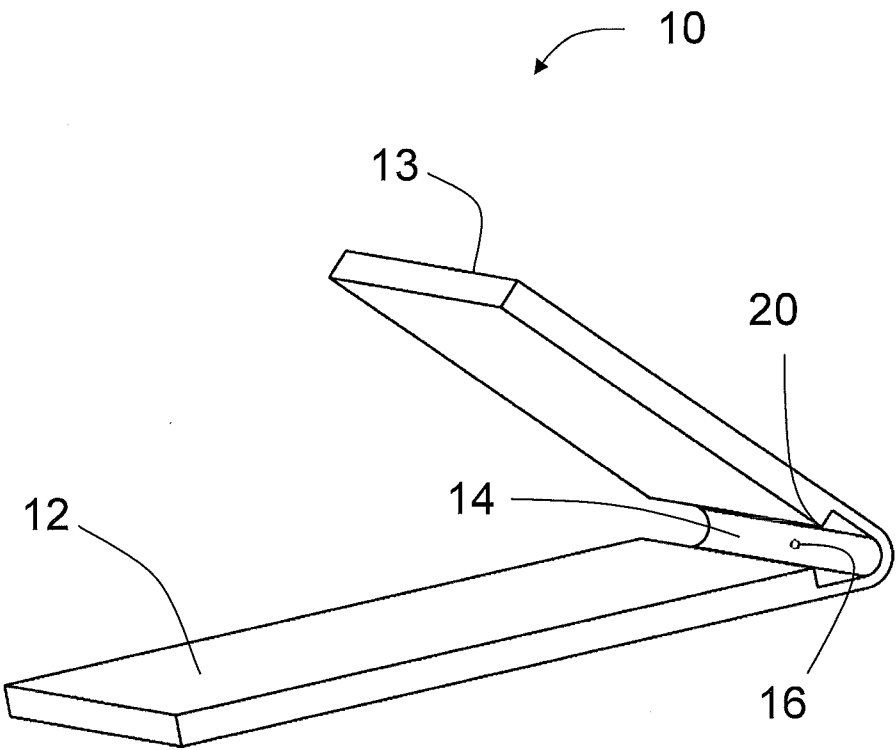


FIG. 1

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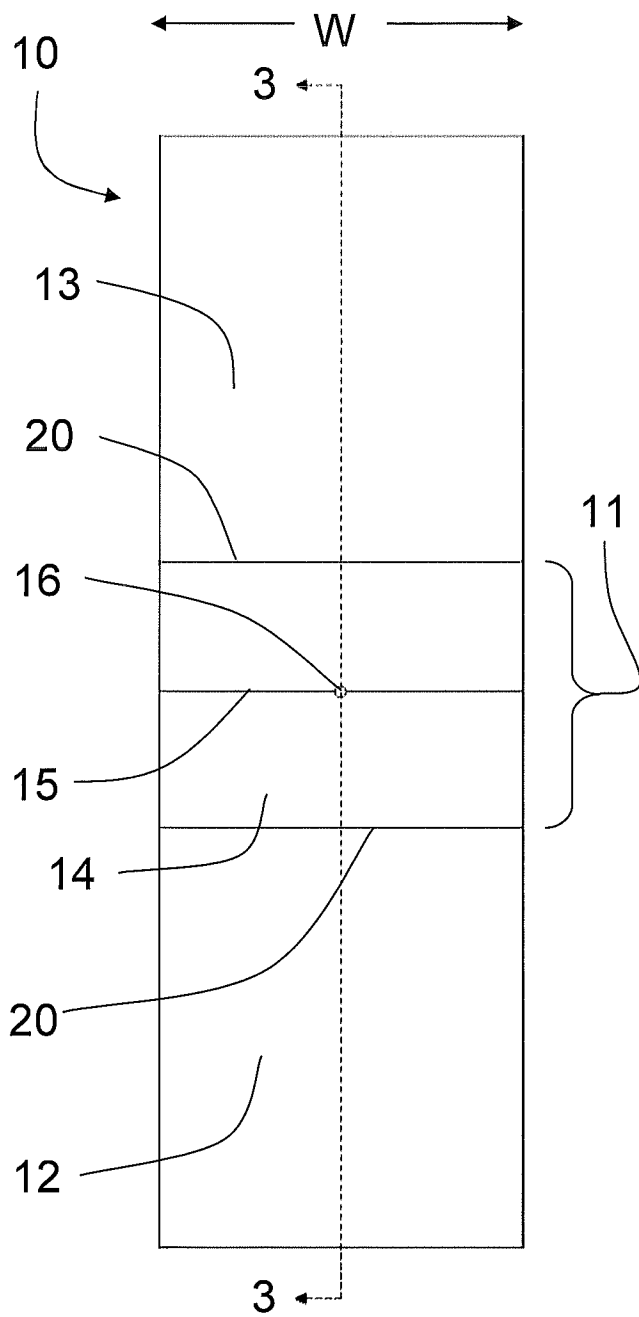


FIG. 2

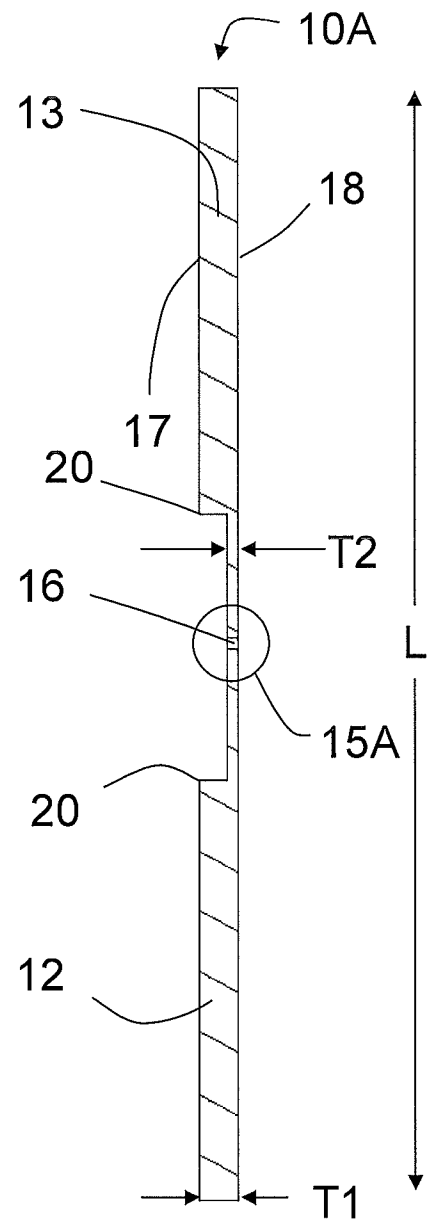


FIG. 3

3 / 10

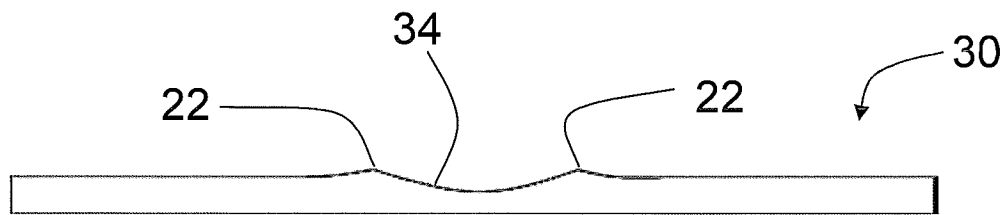


FIG. 4A

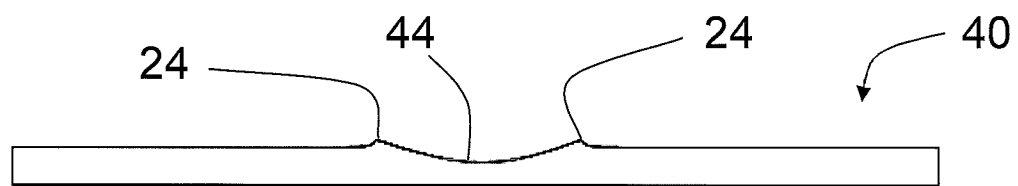


FIG. 4B

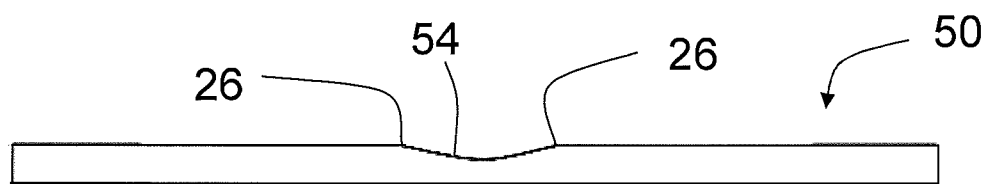


FIG. 4C

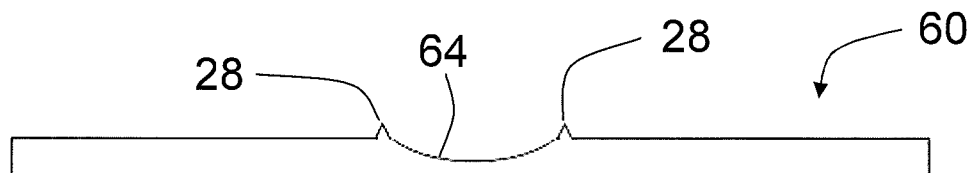


FIG. 4D

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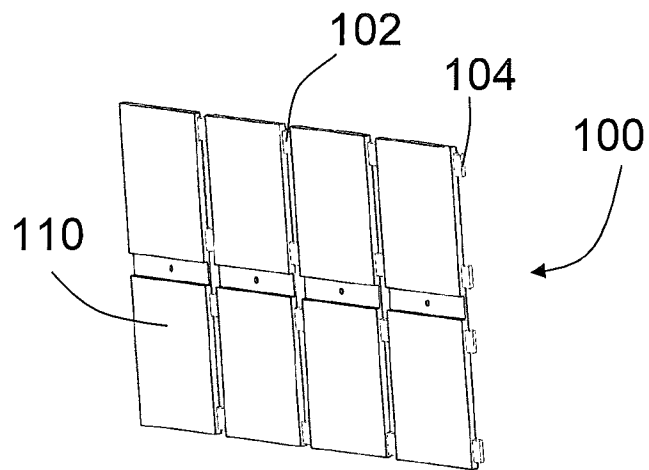


FIG. 5

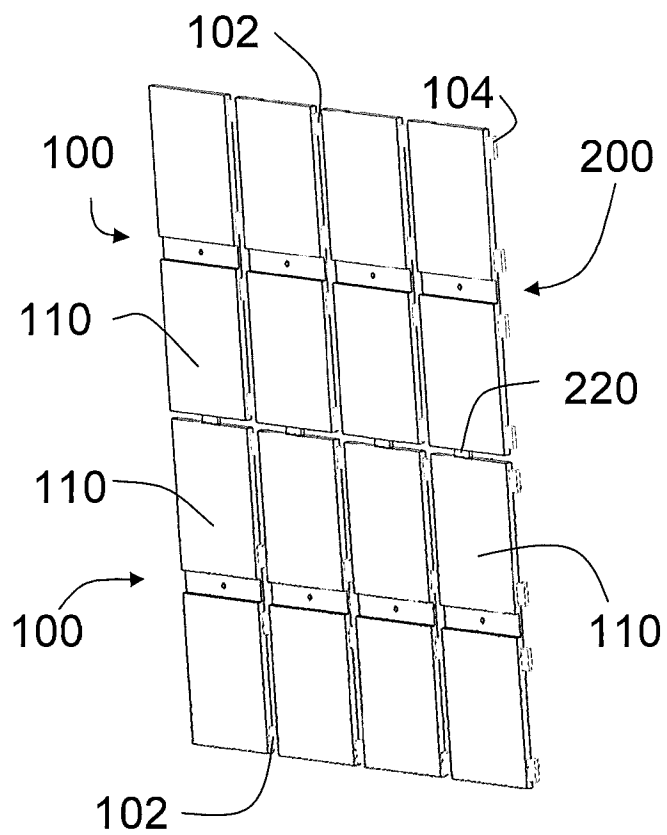


FIG. 6

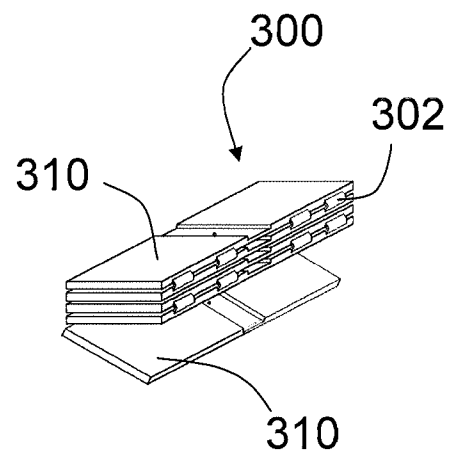


FIG. 7

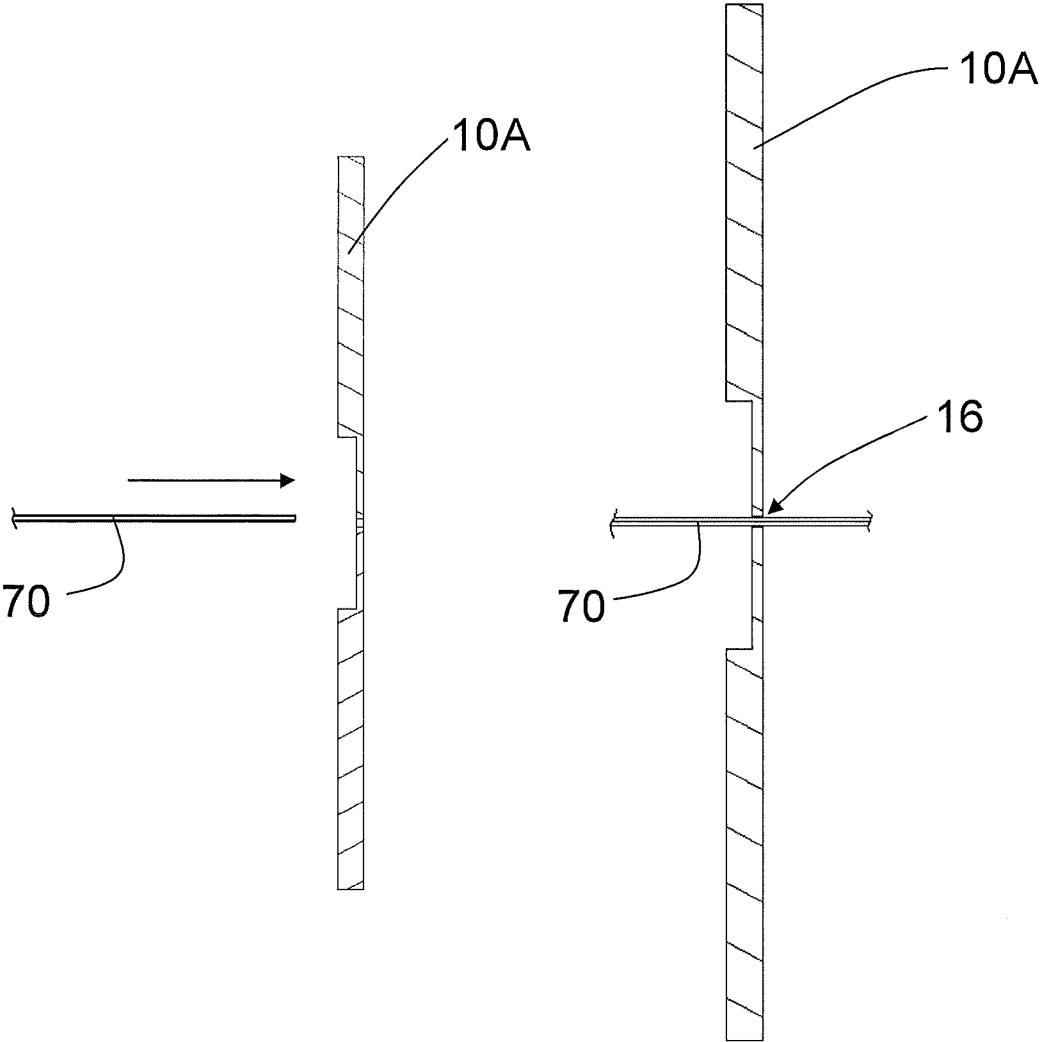


FIG. 8

FIG. 9

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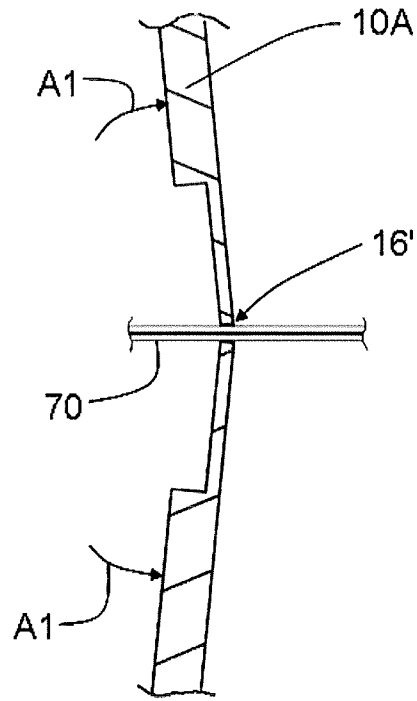


FIG. 10

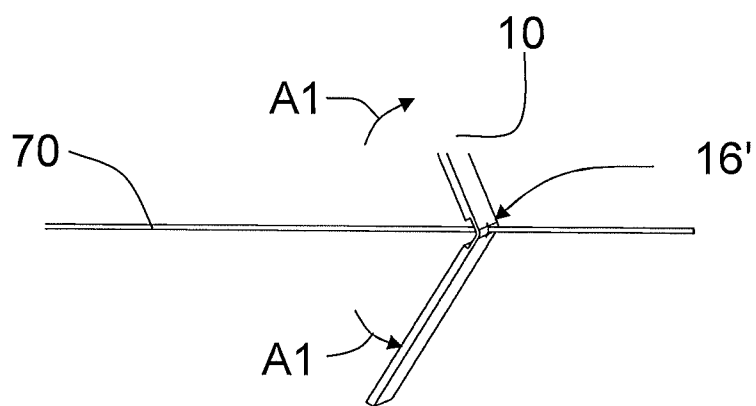


FIG. 11

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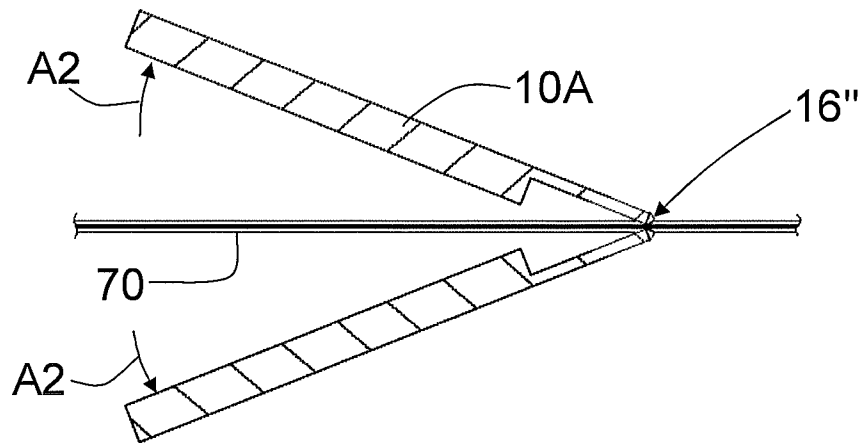


FIG. 12

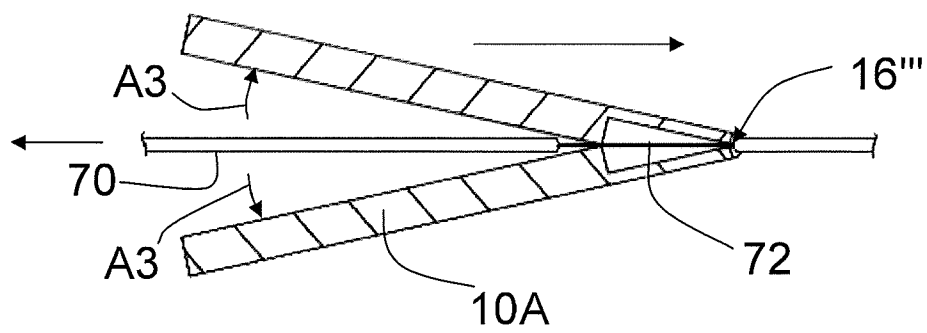


FIG. 13

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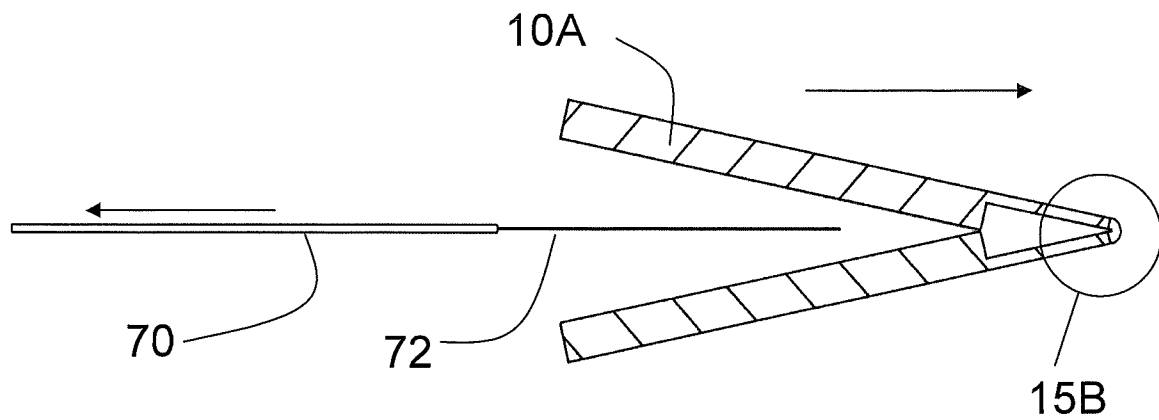


FIG. 14

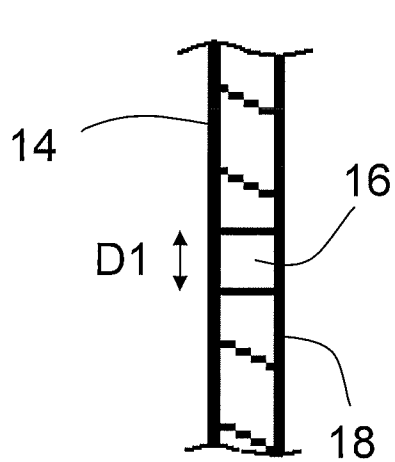


FIG. 15A

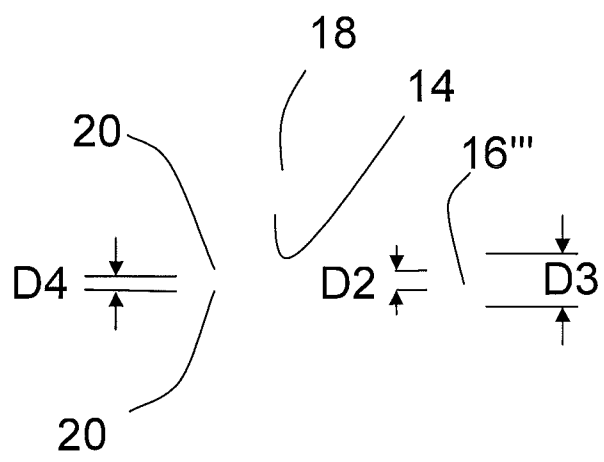


FIG. 15B

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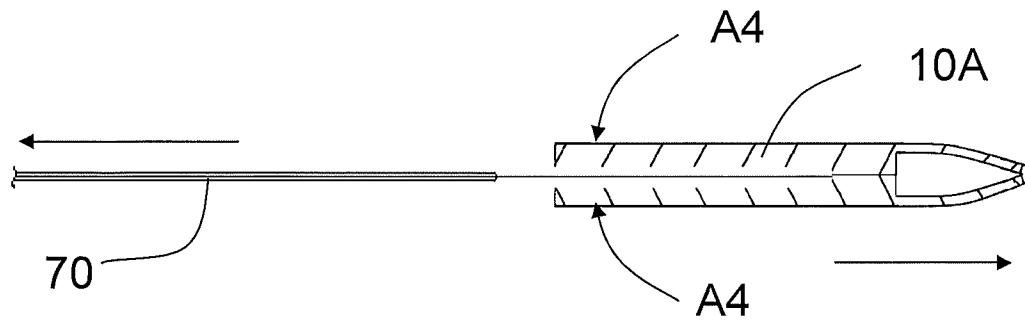


FIG. 16

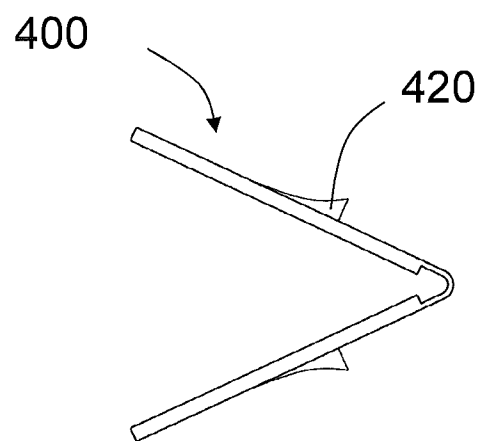


FIG. 17

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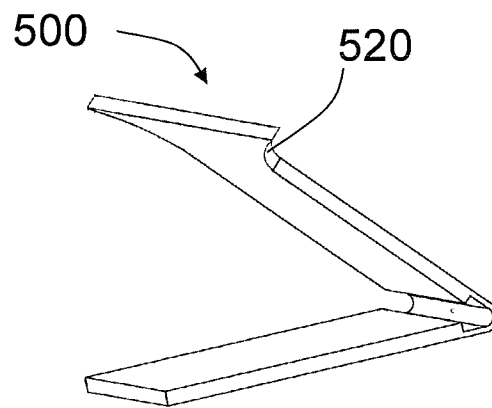


FIG. 18

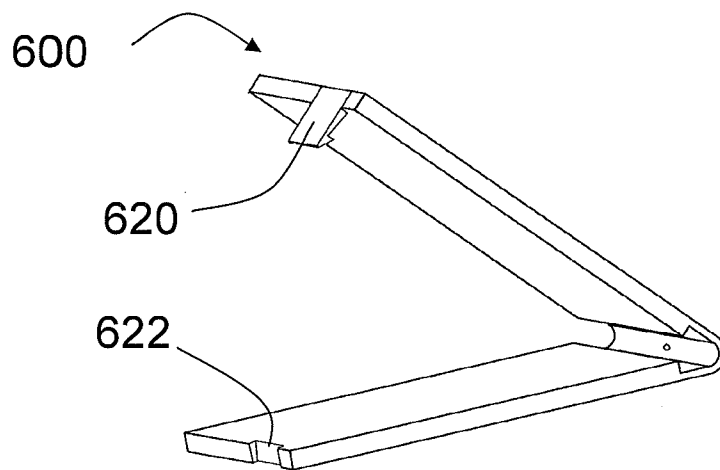


FIG. 19

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/29762

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H02G 1/12 (2012.01)

USPC - 81/9.44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8): H02G 1/12 (2012.01)

USPC: 81/9.44

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 225/2, 93, 94, 96, 96.5, 102, 103; 30/90.1; 81/9.4, 9.41, 9.42, 9.43

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Thomson Innovation; Google/Patents; Google/Web; EPO Espacenet

Search terms: Pivot, fold, collapse, bend, bent, rotate, hinge, living, integral, cable, wire, cord, fiber, fibre, optic, strip, cut, sever, trim, coating, insulation, sleeve, sheath, aperture, hole, orifice, opening, slot, blade, through, diameter, gauge, size, plural, array, etc.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,151,510 A (BUNKER et al.) 06 October 1964 (06.10.1964), col 1, lns 9-14; col 3, lns 10-12; Figs. 1, 3-5, 7	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
Y	EP 0 046 022 A2 (SPRUNGER) 17 February 1982 (17.02.1982), Abstract; Fig. 1	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
Y	US 2005/0044715 A1 (SHUTTS et al.) 03 March 2005 (03.03.2005), para [0001], [0022], Figs. 1, 2	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
Y	US 2010/0096281 A1 (STOPEK et al.) 22 April 2010 (22.04.2010), para [0017], [0033]; Figs. 1, 4, 5	14, 17, 19, 20/14, 20/17, 20/19, 32, 36, 38/36, 43, 44
Y	US 2009/0029569 A1 (FIORENTINO) 29 January 2009 (29.01.2009), para [0002], [0022]	20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37
A	US 3,771,222 A (SAKUMA) 13 November 1973 (13.11.1973), Figs. 1-3	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48

☒ Further documents are listed in the continuation of Box C.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

27 June 2012 (27.06.2012)

Date of mailing of the international search report

13 JUL 2012

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/29762

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 1,065,679 A (GREGSON et al.) 24 June 1913 (24.06.1913), Figs. 1-3	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
A	US 1,490,459 A (FERGUSON) 15 April 1924 (15.04.1924), Figs. 1-4	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
A	US 2,609,716 A (FORMAN) 09 September 1952 (09.09.1952), Figs. 1-5	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
A	US 4,184,389 A (DVORAK) 22 January 1980 (22.01.1980), Figs. 1-3	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
A	US 5,850,773 A (Burns) 22 December 1998 (22.12.1998), entire document	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48
A	US 6,598,509 B1 (Cook et al.) 29 July 2003 (29.07.2003), entire document	1-19, 20/1-19, 21-33, 34/21, 34/33, 35-37, 38/35-37, 39-48