

CLAIMS

1. A method of processing glass filament, comprising:
providing a length of glass filament from which a portion is to be separated from
5 the remainder of the filament;
directing energy onto the filament in order to cause a decrease in a width of the
filament at a desired location for separation of the portion; and
moving the portion away from the remainder of the filament to obtain the portion
separated from the remainder of the filament.
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2. A method according to claim 1, in which the separated portion forms a cane able
to be drawn into optical fibre.
3. A method according to claim 1 or claim 2, in which the energy is in the form of
15 one or more laser beams or flames or plasma beams applied to the filament.
4. A method according to claim 3, in which the energy is directed to at least one
focus substantially at the surface of the filament at the desired location.
- 20 5. A method according to any one of claims 1 to 4, in which directing energy onto
the filament comprises directing energy onto two or more regions circumferentially
disposed around the filament at the desired location.
- 25 6. A method according to any one of claims 1 to 5, further comprising causing
relative rotational movement between the filament and the energy while directing the
energy onto the filament, in order to direct energy onto a region or regions
circumferentially disposed around the filament at the desired location.
- 30 7. A method according to any one of claims 1 to 6, in which directing energy onto
the filament causes the width of the filament to decrease to zero at the desired location,
thereby separating the portion from the remainder of the filament.
- 35 8. A method according to any one of claims 1 to 6, in which directing energy onto
the filament reduces the width of the filament at the desired location to greater than zero,
and moving the portion away from the remainder of the filament comprises causing

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relative longitudinal movement between the portion and the remainder of the filament to separate the portion from the remainder of the filament at the desired location.

9. A method according to claim 8, further comprising, during the directing energy,
5 holding the remainder of the filament with a first clamp arrangement at a first position, and holding the portion with a second clamp arrangement at a second position longitudinally spaced from the first position, and causing the relative longitudinal movement by increasing the spacing between the first clamp arrangement and the second clamp arrangement.

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10. A method according to claim 8, further comprising, during the directing energy, holding one of the remainder of the filament and the portion with a clamp arrangement, and causing the relative longitudinal movement by allowing the portion to move under gravity.

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11. A method according to any one of claims 1 to 10, comprising directing energy onto the filament that is sufficient to cause softening and deformation of the glass of the filament into a necked region at the desired location.

20 12. A method according to claim 11, further comprising applying crimping jaws to the softened glass to aid deformation into the necked region.

13. A method according to claim 11 or claim 12, in which the filament has an internal structure comprising one or more longitudinal lumina, and deformation of the glass into
25 the necked region comprises collapse of the one or more lumina.

14. A method according to claim 13, in which the deformation and optionally also the moving of the portion away from the remainder of the filament cause a width of the necked region to decrease to zero, thereby closing the lumina at the separated end of
30 the portion.

15. A method according to any one of claims 1 to 10, comprising directing energy onto the filament that is sufficient to cause ablation of the glass of the filament at the desired location.

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16. A method according to claim 15, in which the glass is ablated to form a circumferential slot around the filament at the desired location.
17. A method according to claim 15 or claim 16, further comprising removing vapour and/or debris generated by the ablation by providing a flow of air to carry vapour and/or debris away from the filament.
18. A method according to any one of claims 15 to 17, in which the filament has an internal structure comprising one or more longitudinal lumina, and directing energy onto the filament comprises directing energy at a non-orthogonal angle to the longitudinal axis of the filament and towards the portion so as to reduce condensation of vapour generated by the ablation inside the lumina in the remainder of the filament.
19. A method according to any one of claims 1 to 18, in which the length of glass filament has been drawn from a glass preform and the method is carried out in a draw tower while the filament is being drawn from the glass preform.
20. A method according to claim 19, in which the filament is drawn from the glass preform using a cane puller comprising a pair of opposing rotating belts arranged to grip opposite sides of the filament and pull the filament in a longitudinal direction away from the preform.
21. A method according to claim 20, in which the pair of opposing rotating belts are arranged such that the axis of rotation of each belt is orthogonal to the longitudinal direction.
22. A method according claim 20, in which the pair of opposing rotating belts are arranged such that the axes of rotation of the belts are at opposite and substantially equal non-orthogonal angles to the longitudinal direction, in order to cause rotation of the drawn filament about its longitudinal axis.
23. A cane suitable for drawing into an optical fibre and which has been obtained by separation from a glass filament using a method according to any one of claims 1 to 22.
24. A cane according to claim 21, having an internal structure comprising one or more longitudinal lumina and having one or more closed ends.

25. A device for drawing glass filament from a preform, comprising:
a pair of rotatable belts each having a movable surface rotatable about an axis of rotation, the belts arrangeable into positions in which the movable surfaces are facing
5 with a separation to receive and grip the glass filament, movement of the surfaces acting to pull the filament away from the preform along a direction of a longitudinal axis of the filament,
in which the axes of rotation of the belts are locatable at opposite and substantially equal non-orthogonal angles to the pull direction, in order to impart a
10 rotation to the filament about its longitudinal axis.
26. A device according to claim 25, in which the axes of rotation of the belts are additionally locatable parallel to one another and substantially orthogonal to the pull direction, in order to pull the filament without imparting a rotation.
- 15 27. A device according to claim 25 or claim 26, in which the opposite and substantially equal non-orthogonal angles can be altered, in order to modify a speed of the rotation, including being reversed in order to reverse a direction of the rotation.