

IN THE CLAIMS**1. A beam director comprising**

a rotatable first reflector configured to receive a beam from a beam source along a rotational axis of the first reflector;

an actuator for rotating the first reflector about the rotational axis, whereby the first reflector rotates the beam and reflects the beam at a constant angle to the first rotational axis

a second reflector constantly facing the first reflector at a constant angle; the second reflector configured to reflect the beam towards a work surface at a constant angle thereto,

whereby when the beam is activated and the actuator rotates the first reflector, the beam strikes the rotating first reflector rotating and reflecting the beam to the second reflector, which reflects the beam to the work surface; the beam then following a curve path relative to the work surface and traces out an arc on the work surface.

2. A beam director as in claim 1, further comprising a distance adjuster for adjusting a radial distance between the first reflector and the second reflector so that the beam follows a curved path with adjustable radii relative to the work surface and traces out arcs of adjustable radii on the work surface.

3. A beam director as in claim 1 wherein the second reflector comprises a rotationally-stationary, slanted, annular reflecting surface, encircling the first reflector; the second reflector at an angle to the rotational axis of the first reflector;

wherein the annular reflecting surface having a large diameter and a small diameter, the large diameter directed towards the work surface

whereby when the beam is activated and the actuator rotates the first reflector; the beam strikes the rotating first reflector rotating and reflecting the beam to the annular reflecting surface of the second reflector, which reflects the beam to the work surface.

4. A beam director as in claim 1 wherein the second reflector includes a rotationally-stationary cone shaped inner surface; encircling the first reflector and having a longitudinal axis the same as the rotational axis of the first reflector; a larger diameter of the cone shaped inner surface

directed towards the work surface and configured to reflect the beam from the first reflector towards the work surface;

wherein the second reflector is vertically adjustable relative to the first reflector; whereby the distance the beam travels from the first to the second reflector is adjustable due to the conical shape of the inner surface of the second reflector so that the beam follows a curved path of adjustable radii relative to the work surface and traces out arcs of adjustable radii on the work surface.

5. A beam director as in claim 1 wherein the second reflector is configured to be rotatable by the actuator in a circle around the rotational axis of first reflector as the first reflector rotates.

6. A beam director as in claim 5, further comprising a rotor disk rotatable around the rotational axis for supporting the first and second reflectors.

7. A beam director as in claim 6, further comprising a radial slide mounted on the rotor disk for adjusting a radial distance between the first and second reflectors

8. A beam director as in claim 1 wherein the second reflector is configured to reflect the beam from the first reflector parallel to the rotational axis of first reflector and perpendicular to the work surface.

9. A beam director as in claim 5, further comprising a rotor arm rotatable around the rotational axis for supporting the first and second reflectors.

10. A beam director as in claim [[1]] 9, further comprising a stabilizing arm for stabilizing the first and second reflectors.

11. A beam director as in claim 1, further comprising an aerodynamic housing enclosing the first and second reflectors to control airflow.

12. A print head for a three dimensional printer comprising the beam director of claim 1.

13. A method of directing a beam towards a work surface with a beam director, the method comprising:

generating a beam with a beam source;

rotating a first reflector about a rotational axis with an actuator;

directing the beam towards the first reflector along the rotational axis of the first reflector;

providing a second reflector constantly facing the first reflector at a constant angle as the first reflector rotates;

reflecting the beam with the first reflector at a constant angle to the rotational axis towards the second reflector;

reflecting the beam with the second reflector towards a work surface;

so that when the beam is activated and the actuator rotates the first reflector; the beam strikes the rotating first reflector rotating the beam and reflecting the beam to the second reflector, which reflects the beam to the work surface at a constant angle thereto; the beam then following a curved path relative to the work surface and traces out an arc on the work surface.

14. The method of claim 13 further includes adjusting the distance between the first and the second reflector so that the beam follows a curve path of adjustable radii relative to the work surface and traces out arcs of adjustable radii on the work surface.

15. The method of claim 13, wherein the second reflector comprises a slanted annular reflecting surface encircling the first reflector; being rotationally stationary and having a central axis the same as the rotational axis of the first reflector;

wherein the annular reflecting surface includes a large diameter and a small diameter, the large diameter directed towards the work surface; so that when the beam is activated and the actuator rotates the first reflector; the vertical beam strikes the rotating first reflector rotating and reflecting the beam to the annular reflecting surface of the second reflector, which reflects the beam to the work surface; the beam then following a curve path relative to the work surface and tracing out an arc on the work surface.

16. The method of claim 13, wherein the second reflector is cone shaped; encircling the first reflector and including a longitudinal axis the same as the rotational axis of the first reflector; wherein the second reflector is rotationally stationary; wherein a larger diameter of the second reflector is directed towards the work surface; wherein the method further comprises adjusting the distance between the first and second reflectors, so that the distance the beam travels from the first to the second reflector is adjusted due to the conical shape of the second reflector; whereby the beam follows a curve path of adjustable radii relative to the work surface and traces out arcs of adjustable radii on the work surface.

17. The method of claim 13 further comprising rotating the second reflector in a circle around the rotational axis of first reflector as the first reflector rotates.

18. The method of claim 13 further comprising conveying the beam to the beam director with a beam conduit.

19. The method of claim 13, wherein the second reflector reflects the beam parallel to the rotational axis of first reflector and perpendicular to the work surface.

20. The method as in claim 17, further includes rotating a rotor arm supporting the first and second reflectors around the rotational axis.

21. The method as in claim 20, further includes stabilizing the rotation of first and second reflectors by attaching a stabilizing member to the rotor arm.

22. The method as in claim 13 further includes placing the first and second reflectors in an aerodynamic housing to control airflow.

23. The method of claim 13 further includes using the beam director as a print head for a three dimensional printer.