CLAIMS

1. A stereolithography machine comprising:

a container, containing a base material in a liquid or paste state defining an external surface delimiting said base material;

a light emitting unit to emit a light beam;

a light reflecting device suited to deviate said light beam and to be controlled in such a way that said light beam is incident on any point of an incidence area belonging to said external surface;

a logic control unit to control said light reflecting device in such a way that said light beam is selectively incident on any point of an operating area belonging to said incidence area;

an optical unit to focus said light beam on a focal surface defined by the points where said light beam has minimum cross section along the different directions defined by said light reflecting device, said optical unit being arranged between said light emitting unit and said light reflecting device;

wherein said optical unit is configured in such a way that said focal surface is spherical, and said light emitting unit and said optical unit are configured in such a way that the ratio between the maximum diameter of the intersection between said light beam and said operating area across the entire operating area and the diameter (w_F) of said minimum cross section does not exceed 1.15.

2. The stereolithography machine according to claim 1, wherein said optical unit is fixed.

3. The stereolithography machine according to claim 1 or 2, wherein said light emitting unit and said optical unit are configured in such a way that said ratio is between 1.10 and 1.15.

4. The stereolithography machine according to any one of claims 1 to 3, wherein said light emitting unit and said optical unit are configured so as to minimize said diameter (w_F) of said minimum cross section, with a given predefined configuration of said operating area and a given predefined distance between said operating area and said light reflecting device.

5. The stereolithography machine according to any one of claims 1 to 4, wherein said focal surface intersects said operating area in such a way that a first portion of said focal surface is arranged within said base material and a second portion of said focal surface is arranged outside said base material.

6. The stereolithography machine according to claim 5, wherein said light emitting unit and said optical unit are configured in such a way that the maximum intersection area between said light beam and said operating area when said light beam is directed towards said first portion is equal to the maximum intersection

area between said light beam and said operating area when said light beam is directed towards said second portion.

7. The stereolithography machine according to claim 5 or 6, wherein said light reflecting device is configured in such a way that the intersection between said focal surface and said operating area is a circumference.

8. The stereolithography machine according to claim 7, wherein said logic control unit is configured in such a way that said operating area is circular and concentric with said circumference.

9. The stereolithography machine according to claim 8, wherein said circular operating area is inscribed in said incidence area.

10. The stereolithography machine according to claim 9, wherein the diameter of said circular operating area is included between 170 mm and 190 mm.

11. The stereolithography machine according to any one of claims 1 to 10, wherein said optical unit is a lens or set of lenses arranged in series.

12. The stereolithography machine according to any one of claims 1 to 11, wherein said light emitting unit emits a collimated light beam.

13. The stereolithography machine according to claim 12, wherein said light emitting unit comprises a laser emitter.

14. The stereolithography machine according to claim 12 or 13, wherein said light emitting unit is configured in such a way that the cross section of said collimated light beam is symmetrical according to two mutually orthogonal axes of symmetry.

15. A method for producing the stereolithography machine according to any one of claims 1 to 14, comprising:

a designing phase comprising the steps of:

defining a configuration for said operating area;

defining a distance between said light reflecting device and said operating area;

calculating values of design parameters for said light emitting unit and said optical unit in such a way as to minimize the value of said diameter (w_F) of said minimum cross section under condition that the value of the ratio between the maximum diameter of the intersection between said light beam and said operating area across the entire operating area and the diameter (w_F) of said minimum cross section is less than, or equal to, 1.15, said design parameters comprising at least a diameter (w_L) and quality coefficient (M^2) of said light beam incident on said optical unit, and a focal length (f) of said optical unit;

selecting said light emitting unit and said optical unit according to said values of said design parameters; and

an implementation phase comprising the steps of:

arranging according to said values of said design parameters, said light reflecting device, said light emitting unit, said optical unit and the container, containing the base material in the liquid or paste state defining the external surface delimiting said base material;

defining said operating area; and

arranging said optical unit between said light emitting unit and said light reflecting device.

16. The method according to claim 15, wherein said design parameters comprise a parameter representative of an aberration of said optical unit.