WHAT IS CLAIMED IS:

1. A laser processing apparatus comprising:

a holding mechanism for holding a workpiece;

a laser beam applying mechanism for applying a laser beam to the workpiece held by the holding mechanism while keeping a converged spot of the laser beam in the workpiece;

a moving mechanism for moving the holding mechanism in a processing feed direction and an indexing feed direction;

a controller for controlling at least the laser beam applying mechanism and the moving mechanism; and

a temperature detector for detecting a temperature of the holding mechanism or a temperature of an actuator of the moving mechanism that moves the holding mechanism in the processing feed direction,

wherein the laser beam applying mechanism has a converged spot position adjusting unit for adjusting a position of the converged spot of the laser beam in a thicknesswise direction of the workpiece, and

the controller, depending on a temperature change detected by the temperature detector,

controls the converged spot position adjusting unit to establish a position of the converged

spot of the laser beam in the thicknesswise direction of the workpiece, and

controls the actuator to establish a position of the converged spot of the laser beam in the indexing feed direction, thereby correcting the positions of the converged spot of the laser beam;

wherein the actuator of the moving mechanism that moves the holding mechanism in the processing feed direction is a linear motor having electromagnetic coils, and

the temperature detector detects a temperature of the electromagnetic coils.

2. The laser processing apparatus according to claim 1,

wherein the controller stores in advance a correlation map defining a correlation between temperature changes of the holding mechanism or the actuator and changes in the position of the converged spot, and

the controller acquires a change in the position of the converged spot that corresponds to the temperature change detected by the temperature detector by referring to the correlation map, and

corrects the position of the converged

spot of the laser beam, using a corrective value corresponding to the acquired change in the position of the converged spot.

3. A method of correcting a position of a converged spot of a laser beam in a laser processing apparatus including a holding mechanism for holding a workpiece, a laser beam applying mechanism for applying the laser beam to the workpiece held by the holding mechanism while keeping the converged spot of the laser beam in the workpiece, a moving mechanism for moving the holding mechanism in a processing feed direction and an indexing feed direction, a controller for controlling at least the laser beam applying mechanism and the moving mechanism, and a temperature detector for detecting a temperature of the holding mechanism or a temperature of an actuator of the moving mechanism that moves the holding mechanism in the processing feed direction,

the laser beam applying mechanism having a converged spot position adjusting unit for adjusting the position of the converged spot of the laser beam in a thicknesswise direction of the workpiece,

the method comprising:

a temperature detecting step of detecting a

temperature with the temperature detector;

a corrective value calculating step of calculating a corrective value for shifting the position of the converged spot of the laser beam on a basis of the detected temperature; and

a converged spot position correcting step of, on a basis of the corrective value, controlling the converged spot position adjusting unit to establish a position of the converged spot of the laser beam in the thicknesswise direction of the workpiece, and controlling the actuator to establish a position of the converged spot of the laser beam in the indexing feed direction, thereby correcting the positions of the converged spot of the laser beam;

wherein the actuator of the moving mechanism that moves the holding mechanism in the processing feed direction is a linear motor having electromagnetic coils, and

the temperature detector detects a temperature of the electromagnetic coils.

4. The method according to claim 3,

wherein the controller stores in advance a correlation map defining a correlation between temperature changes of the holding mechanism or the

actuator and changes in the position of the converged spot, and

the controller, in the corrective value calculating step,

acquires a change in the position of the converged spot that corresponds to the temperature change detected by the temperature detector by referring to the correlation map, and

calculates a corrective value corresponding to the acquired change in the position of the converged spot.