WHAT IS CLAIMED IS:

1. A laser processing apparatus for forming a separation layer inside an ingot by applying a laser beam to an end surface of said ingot in a condition where a focal point of said laser beam is set inside said ingot, said laser beam having a transmission wavelength to said ingot, said laser processing apparatus comprising:

holding means for holding said ingot;

moving means for moving said holding means in a direction parallel to the end surface of said ingot held by said holding means;

laser beam applying means for applying said laser beam to said ingot held by said holding means, said laser beam applying means having focusing means for focusing said laser beam so that the focal point is movable in a direction perpendicular to the end surface of said ingot held by said holding means;

imaging means for detecting a position of said ingot in a direction parallel to the end surface of said ingot held by said holding means;

height detecting means for detecting a height of the end surface of said ingot held by said holding means; and

focal position adjusting means for adjusting the

focal point of said laser beam to a predetermined depth from the end surface of said ingot held by said holding means according to a detection value obtained by said height detecting means, said predetermined depth corresponding to the thickness of a wafer to be produced from said ingot.

2. The laser processing apparatus according to claim 1, wherein said height detecting means includes a contact terminal, a moving unit for moving said contact terminal until said contact terminal comes into contact with the end surface of said ingot held by said holding means, and a scale for detecting the position of said contact terminal.

3. The laser processing apparatus according to claim 2, wherein said contact terminal is provided adjacent to said imaging means, and said scale and said moving unit are included in said imaging means.

4. A method for forming a separation layer inside an ingot using a laser processing apparatus by applying a laser beam to an end surface of said ingot in a condition where a focal point of said laser beam is set inside said ingot, said laser beam having a transmission wavelength to said ingot, the method comprising the acts of:

holding said ingot using a holding means;

moving said holding means in a direction parallel to the end surface of said ingot held by said holding means;

applying said laser beam to said ingot held by said holding means, wherein said laser beam is focused so that the focal point is movable in a direction perpendicular to the end surface of said ingot held by said holding means;

detecting a position of said ingot in a direction parallel to the end surface of said ingot held by said holding means;

detecting a height of the end surface of said ingot held by said holding means; and

adjusting the focal point of said laser beam to a predetermined depth from the end surface of said ingot held by said holding means according to a detection value obtained by said act of detecting the height of the end surface, said predetermined depth corresponding to the thickness of a wafer to be produced from said ingot.

5. The method according to claim 4, wherein said act of detecting the height of the end surface is performed by a height detecting means that includes a contact terminal, the method further comprising the act of:

moving said contact terminal until said contact

terminal comes into contact with the end surface of said ingot held by said holding means, and

detecting the position of said contact terminal when said contact terminal comes into contact with the end surface of said ingot.

6. The method according to claim 5, wherein said act of detecting a position of said ingot is performed by imaging means; wherein said act of detecting the position of said contact terminal when said contact terminal comes into contact with the end surface of said ingot is performed using a scale; and wherein said act of moving said contact terminal is performed by a moving unit,

wherein said contact terminal is provided adjacent to said imaging means, and said scale and said moving unit are included in said imaging means.