

WE CLAIM:

1. An up-drawing continuous casting apparatus characterized by comprising:
 - a holding furnace (101) that holds molten metal;
 - a shape determining member (102) that is arranged near a molten metal surface of the molten metal held in the holding furnace, and that determines a sectional shape of a casting by the molten metal passing through the shape determining member;
 - a cooling portion (106) that cools and solidifies the molten metal that has passed through the shape determining member; and
 - a molten metal cooling portion (107) that lowers a temperature of the molten metal held in the holding furnace.
2. The up-drawing continuous casting apparatus as claimed in claim 1, characterized in that the molten metal cooling portion is provided directly below the shape determining member.
3. The up-drawing continuous casting apparatus as claimed in claim 1 or 2, characterized by further comprising:
 - an actuator (109) that moves the molten metal cooling portion in a top-bottom direction inside the holding furnace.
4. The up-drawing continuous casting apparatus as claimed in any one of claims 1 to 3, characterized in that cooling gas passes through an inside of the molten metal cooling portion.
5. The up-drawing continuous casting apparatus as claimed in any one of claims 1 to 4, characterized in that the molten metal cooling portion is made of ceramic.
6. The up-drawing continuous casting apparatus as claimed in any one of claims 1 to 5, characterized by further comprising:
 - a partition wall (110) that surrounds the molten metal; and
 - an ambient temperature regulating portion (111) that regulates a temperature of an atmosphere surrounded by the partition wall.

7. An up-drawing continuous casting method that uses a casting apparatus having a shape determining member (102) that determines a sectional shape of a casting, a holding furnace (101) that holds a molten metal, and a molten metal cooling portion (107) provided in the holding furnace, the up-drawing continuous casting method characterized by comprising:

arranging the shape determining member near a molten metal surface of the molten metal held in the holding furnace;

lowering a temperature of the molten metal held in the holding furnace, with the molten metal cooling portion;

passing the molten metal that has been lowered in temperature through the shape determining member and drawing up the molten metal; and

cooling the molten metal that has passed through the shape determining member and been drawn up.

8. The up-drawing continuous casting method as claimed in claim 7, characterized in that the molten metal cooling portion is provided directly below the shape determining member.

9. The up-drawing continuous casting method as claimed in claim 7 or 8, characterized by further comprising:

moving the molten metal cooling portion in a top-bottom direction inside the holding furnace.

10. The up-drawing continuous casting method as claimed in any one of claims 7 to 9, characterized in that lowering the temperature of the molten metal is done by leading cooling gas into the molten metal cooling portion.

11. The up-drawing continuous casting method as claimed in any one of claims 7 to 10, characterized in that the molten metal cooling portion is made of ceramic.

12. The up-drawing continuous casting method as claimed in any one of claims 7 to 11, characterized by further comprising:

surrounding the molten metal with a partition wall (110); and
regulating a temperature of an atmosphere surrounded by the partition wall.

13. An up-drawing continuous casting apparatus characterized by comprising:
a holding furnace (101) that holds molten metal;
a shape determining member (102) that is arranged near a molten metal surface of the molten metal held in the holding furnace, and that determines a sectional shape of a casting by the molten metal passing through the shape determining member; and
a cooling portion (106) that cools and solidifies the molten metal that has passed through the shape determining member with a starter (ST),
wherein the starter has a cooling mechanism that is integrated with the starter.

14. The up-drawing continuous casting apparatus as claimed in claim 13, characterized in that the cooling mechanism includes a pipe that is attached to the starter and into which coolant is introduced.

15. The up-drawing continuous casting apparatus as claimed in claim 13, characterized in that the cooling mechanism is the starter itself that is formed by a pipe into which coolant is introduced.

16. An up-drawing continuous casting method that uses a casting apparatus having a shape determining member (102) that determines a sectional shape of a casting, a holding furnace (101) that holds a molten metal, a starter (ST), and a cooling mechanism that is integrated with the starter, the up-drawing continuous casting method characterized by comprising:

arranging the shape determining member near a molten metal surface of the molten metal held in the holding furnace;

passing the molten metal through the shape determining member and drawing up the molten metal with the starter;

cooling and solidifying the molten metal that has passed through the shape determining member and been drawn up; and

cooling the starter with the cooling mechanism.

17. The up-drawing continuous casting method as claimed in claim 16, characterized in that the cooling mechanism is formed by attaching a pipe to the starter and introducing coolant into the pipe.

18. The up-drawing continuous casting method as claimed in claim 16, characterized in that the cooling mechanism is formed by introducing coolant into the starter itself that is formed by a pipe.

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