[0064] The pressing plate **5** exhibits a function of suppressing misalignment between the wires to be connected in the longitudinal direction of the wires (clamping function) and a function of transferring heat of the heating body **4** to the bonding portion of the wires. Therefore, it is preferable that the pressing plate **5** has a strength with which the connection portion of the wires can be sufficiently pressed and has a material and a shape such that heat from the heating body **4** can be sufficiently transferred to the connection portion of the wires.

[0065] In addition, the pressing plate **5** has a function of accelerating the cooling of the solder of the bonding portion of the wires by ensuring a heat dissipation area. Therefore, it is preferable that the pressing plate **5** is made of a material having high heat dissipation properties. Specifically, it is preferable that a metal material having a thickness of 1 mm to 10 mm is used. As the metal material, stainless steel or the like is used. Otherwise, a material having a high thermal conductivity and heat transfer coefficient, such as aluminum, copper, and an alloy thereof, is appropriately used.

[0066] Since the pressing plate **5** is formed in a thin plate shape, the surface area thereof can be large, and thus the heat dissipation properties can be enhanced. In addition, it is preferable that the pressing plate **5** is formed as thin as possible. Accordingly, heat from the heating body **4** can be efficiently transferred to the connection portion of the wires, and the time needed for cooling can also be shortened, and thereby accelerate the solidification of the solder. That is, the production efficiency can be enhanced.

[0067] For the purpose of enhancing heat transfer properties, fins may be provided on the surface of the pressing plate **5**. By providing the fins on the surface, the pressing plate **5** is more effectively cooled during the cooling performed by the air-cooling fan **6**, and thereby accelerate the solidification of the solder. In the case of providing the fins, fins are not formed on portions that come into contact with the heating body **4**.

[0068] The pressing plate **5** preferably includes a temperature measurement unit. The temperature measurement unit is not particularly limited as long as the temperature measurement unit can measure a temperature near the melting point of the solder. As an example, a thermocouple or the like may be employed.

[0069] Since the pressing plate **5** includes the temperature measurement unit, the temperature of the connection portion of the wires, that is, the molten state of the solder can be determined. Therefore, in a state where the wires are pressed by the heating body **4** via the pressing plate **5**, when it is determined that the solder is sufficiently melted, the heating body **4** may be separated from the pressing plate **5**, and cooling of the connection portion may be started. Furthermore, when it is determined that the solder is sufficiently solidified, the pressing plate **5** may be separated from the wires, and a connection process may be completed.

[0070] Similarly, the heating body **4** preferably includes a temperature measurement unit. In addition, it is preferable that a controller which controls the heating member on the basis of the temperature measured by the temperature measurement unit is provided.

[0071] Particularly, in a case where superconducting wires are connected together, in order to prevent a temperature (for example, 300° C. or higher) at which superconducting properties deteriorate due to excessive heating of wires from being reached, the temperature measurement unit and the controller are necessary. As the temperature measurement unit, similarly to the temperature measurement unit provided in the pressing plate **5**, a thermocouple may be employed.

[0072] In the connection process, the connection portion of the wires is pressed by only the pressing plate **5** or by both the pressing plate **5** and the heating body **4**. The pressing force applied to the connection portion needs to be controlled so as not to break the wires. Particularly in the case of connecting the superconducting wires, the pressing force is controlled (for example, to be 20 MPa or lower) such that the crystal structure of the superconductor does not break. Since the wires can be pressed at a predetermined pressure by using the air cylinder as the driver, the breaking of the wires can be suppressed. However, the driver is not limited to the air cylinder, and other drivers such as motor driving may also be employed. In this case, a controller for the pressing force is preferably provided.

[0073] In this embodiment, the pressing plate **5** and the heating body **4** are configured to approach the holding base **7** or be separated from the holding base **7** by being raised and lowered by the first air cylinder **2** or the second air cylinder **3**. The holding base **7** may also be configured to be provided with any driver so that the holding base **7** is elevated by the driver and the holding base **7** approaches and is separated from the pressing plate **5** and the heating body **4**.

[0074] The air-cooling fan (cooling member) **6** has a role as a cooling member that cools the pressing plate **5** in a state where the pressing plate **5** overlaps the upper surface **7***b* of the holding base **7**. Since the cooling member that cools the pressing plate **5** is provided, the pressing plate **5** can be rapidly cooled, and thus the time needed to solidify the solder of the connection portion is reduced, and thereby the production efficiency is increased.

[0075] As the cooling member, as well as the air-cooling fan **6** used in this embodiment, a water-cooling type cooling member may also be used.

[0076] It is preferable that, in the wire splicing device **1** in this embodiment, a storage unit (not shown) which stores optimal connection conditions and a control device (not shown) which controls a series of processes according to the connection conditions stored in the storage unit are built in. Accordingly, by setting the wires to be connected in the wire splicing device **1** and inputting various conditions, the connection process can be automatically completed, and thereby stably, easily, and reliably performing the connection of wires.

[0077] (Splice Structure)

[0078] Next, the wires connected by the wire splicing device **1** of this embodiment and a splice structure after the connection will be described.

[0079] The wire splicing device **1** can be used for connection of various wires as long as the wires are connected by solder, and is particularly appropriately used for connection of superconducting wires.

[0080] As the superconductor used for the superconducting wires, $Bi_2Sr_2Ca_2Cu_3O_{10+\delta}$ (Bi2223) as a Bi-based superconducting wire, $REBa_2Cu_3O_{7-X}$ (RE is a rare-earth element) as an RE-123-based superconducting wire, or the like is known.

[0081] The Bi-based superconducting wire is manufactured to have a tape-like structure by a Powder In Tube method (PIT method) so that a Bi-based superconducting layer is in a state of being coated with an Ag sheath material.