

Title (en)
 DEVICE FOR LOADING AND UNLOADING SILICON WAFERS IN AN OVEN FROM A MULTIPLE-CASSETTE STATION

Title (de)
 BE- UND ENTLADEVORRICHTUNG AUS EINER MEHRKASSETTEN STATION FÜR WAFERSCHEIBEN IN EINEM OFEN

Title (fr)
 DISPOSITIF DE CHARGEMENT ET DE DECHARGEMENT DE PLAQUETTES DE SILICIUM DANS DES FOURS A PARTIR D'UNE STATION MULTI-CASSETTES

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Application
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Abstract (en)
 [origin: FR2824543A1] The device for automatic loading and unloading of a load into a thermal treatment unit (1) of diffusion oven type comprises a set of cantilevers (2) designed so to receive the total load comprising a set of silicon wafers (4) arranged in batches in baskets (5), and equipment including a manipulator lift (11) with an arm (18), a gripping head (17) and an orientation-pivoting horizontal support (8) for distributing the silicon wafers into carriers (6) made of quartz or other suitable material such as silicon carbide. The equipment for an automatic transfer of multi-basket set received at a reception site to the cantilevers (2) ensures the transfer of the total load and possibly a false load, screen loads and sample elements, and inversely the transfer of the total treated load back to the reception site, and the transfer of the cantilevers (2) to the original positions, the screen loads and the sample elements. The operations of transfer are effected according to a predetermined plan registered in a memory store of a multi-purpose supervision unit electrically connected to the transfer equipment to ensure the control of various operations. The baskets (5) are made of a synthetic material, and the silicon wafers they contain are transferred into the carriers (6), when the carrier is full, the contents are transferred to the cantilever (2). The supervision unit comprises a tactile flat screen whereon different parameters are displayed as well as various plans possible in the loading operation, and in each plan it is defined the positions of the carriers, the number of product of false wafers, the positions of sample wafers in dedicated carriers, and the automatic loading of screen carriers. A multi-basket transfer station (3) comprises the reception site constituted by the upper face of a horizontal platform (7) designed for the reception in an ordered manner of a number of baskets, 8-12, each containing 25 wafers. The manipulator lift (11) with the gripping head (17), the multi-basket station for automatic loading and unloading, and the orientation-pivoting horizontal support (8) are electrically connected to the supervision unit. The equipment also comprises several niches (14) for storing empty carriers (6), and several intelligent niches (15) for storing the carriers containing screen loads, which are positioned for lifting above the multi-basket transfer station (3). The reception site comprises several pairs of positioning elements which are received in matching vertical openings of baskets. The motion of wafers during their transfer between the basket (5) and the carrier (6) is decomposed into a vertical ascending translation, a horizontal translation at a higher level, and a vertical descending translation. The vertical translation of wafers from or to the basket is by a lifting organ positioned on the horizontal platform (7) of the transfer station (3), where the horizontal platform has an opening for the passage of the lifting organ and the basket with open bottom allows the lifting organ to push the wafers. Another lifting organ is on the orientation-pivoting horizontal support (8) for the vertical motion of wafers from or to the carrier, where the horizontal support has an opening for the passage of the lifting organ at each carrier with open bottom so to allow the pushing of wafers with maintaining the relative positions. At least one lifting organ is rotation-mobile by 90 deg. around a vertical axis. The transfer station (3) is mobile in a horizontal plane for combining with motions of the loading and unloading station. The baskets are laid out in rows and columns, or in a circle, on the platform (7), which is mobile with horizontal sliding guides in a direction perpendicular to that of the horizontal motion of the loading and unloading station. The transfer station (3) is equipped with a device for an automatic orientation of wafers contained in each basket, and each wafer comprises an orientation marker. The manipulator lift (11) is equipped with temperature sensors, force detectors and the position adjustment of cantilever by laser glasses. A set of sensors is used for verifying the normal development of the transfer sequence, and at least one temperature sensor is used for verifying the normal temperature of carriers.

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