WHAT IS CLAIMED IS:

1. A ring frame holding mechanism for holding a lower surface of a ring frame under suction in a condition where said ring frame is set at a target position by using positioning means, an~~the~~ outer circumference of said ring frame being formed with four flat surfaces including a pair of first flat surfaces opposed in parallel to each other and a pair of second flat surfaces opposed in parallel to each other, a direction of opposition of said first flat surfaces being perpendicular to a direction of opposition of said second flat surfaces, said positioning means being adapted to abut against at least one of said pair of first flat surfaces and said pair of second flat surfaces, said ring frame holding mechanism comprising:

a table having an upper surface for mounting the lower surface of said ring frame, said table including at least one recess formed on the upper surface of said table, said at least one recess having an upper opening;

at least one ~~flexible~~ suction cup provided in said one recess so as to be exposed to said upper opening of said at least one recess;

a vacuum source for applying a vacuum to said at least one suction cup;

a suction passage for connecting said at least one suction cup to said vacuum source;

a first valve provided in said suction passage;

an air source for supplying air to said at least one suction cup;

an air supply passage for connecting said at least one suction cup to said air source; and

a second valve provided in said air supply passage;

said at least one suction cup having an upper end normally projecting upward from said upper opening of said at least one recess, the upper end of said at least one suction cup capable of being stored into said at least one recess by being depressed downward;

wherein when said first valve is closed and said second valve is opened to supply air from said air source to said at least one suction cup and discharge air from said at least one suction cup, an air layer is formed between the upper surface of said table and the lower surface of said ring frame to thereby bring said ring frame and the upper end of said at least one suction cup into a noncontact state and to also depress the upper end of said at least one suction cup downward, so that the upper end of said at least one suction cup becomes flush with the upper surface of said table, and said ring frame

is set to said target position by said positioning means in such a floating condition of said ring frame, and

when said second valve is closed and said first valve is opened to apply the vacuum from said vacuum source to said at least one suction cup, said ring frame is held under suction on the upper end of said at least one suction cup ~~under suction~~.

2. The ring frame holding mechanism according to claim 1, further comprising:

a cylindrical bellows provided in said at least one recess for supporting said at least one suction cup;

wherein when said first valve is opened to hold ~~under suction~~ said ring frame under suction on the upper end of said at least one suction cup, the upper end of said at least one suction cup is depressed downward by the lower surface of said ring frame, and a~~the~~ pressure inside said cylindrical bellows is reduced to a vacuum to produce a pressure difference between a~~the~~ reduced pressure inside said cylindrical bellows and an~~the~~ atmospheric pressure outside said cylindrical bellows, so that said cylindrical bellows is contracted by the atmospheric pressure, and said at least one suction cup is accordingly fully stored into said at least one recess, thereby allowing the upper surface of said table to

support the lower surface of said ring frame.

3. The ring frame holding mechanism according to claim 1, wherein said at least one recess includes a plurality of recesses formed on the upper surface of said table, each of said recesses having an upper opening and a suction cup provided in each of said plurality of recesses so as to be exposed to said upper opening of each of said plurality of recesses.

4. The ring frame holding mechanism according to claim 3, further comprising:

a cylindrical bellows provided in each of said plurality of recesses for supporting each said suction cup;

wherein when said first valve is opened to hold said ring frame under suction on the upper end of each of said suction cups, the upper end of each of said suction cups being depressed downward by the lower surface of said ring frame, and a pressure inside said cylindrical bellows in each of said plurality of recesses is reduced to a vacuum to produce a pressure difference between a reduced pressure inside said cylindrical bellows and an atmospheric pressure outside said cylindrical bellows, so that said cylindrical bellows is contracted by the atmospheric pressure, and

said suction cups are accordingly fully stored into said recesses, thereby allowing the upper surface of said table to support the lower surface of said ring frame.

5. The ring frame holding mechanism according to claim 1, wherein said positioning means includes a first fixed positioning member and a first movable positioning member on said upper surface of said table, wherein said first fixed positioning member and said first movable positioning member are on opposing sides of said upper surface, said first fixed positioning member and said first movable positioning member being configured to engage said pair of first flat surfaces.

6. The ring frame holding mechanism according to claim 5, wherein said

positioning means further includes a second fixed positioning member and a second movable positioning member on said upper surface of said table, wherein

said second fixed positioning member and said second movable positioning member are on opposing sides of said upper surface, said second fixed positioning member and said second movable positioning member being configured to engage said pair of second flat surfaces.