CLAIMS

1. A bonding device, comprising from top down:

a driving device;

a transmission device, in fixed connection with the driving device;

an upper platen assembly, connected to the transmission device;

a lower platen assembly in cooperation with the upper platen assembly, the lower platen assembly configured to support objects to be bonded that are disposed between the lower platen assembly and the upper platen assembly; and

a vacuum chamber, in which the upper platen assembly and the lower platen assembly are both housed,

wherein the upper platen assembly is connected to the transmission device by a flexible platen which is able to expand so as to allow the upper platen assembly to apply a uniform pressure to the objects to be bonded,

wherein the flexible platen comprises, from top down, an upper plate and a lower plate, the upper plate connected to the lower plate by an expandable member, wherein the expandable member comprises lower bellows that are connected at one end to the upper plate and at the other end to the lower plate, wherein a locking mechanism for the expandable member is further disposed between the upper plate and the lower plate and is configured for limiting expansion and contraction of the expandable member.

2. The bonding device of claim 1, wherein a rotation locking mechanism is connected between the flexible platen and the transmission device and is configured to prevent the upper platen assembly from rotating about a central axis of the transmission device.

3. The bonding device of claim 1, wherein the transmission device comprises a main shaft fixed to a top of the flexible platen, the main shaft extending from an interior of the vacuum chamber to an exterior of the vacuum chamber and being fixedly connected to the driving device.

4. The bonding device of claim 3, wherein the main shaft is fixed to the top of the flexible platen through a spherical plain thrust bearing.

5. The bonding device of claim 3, wherein the vacuum chamber comprises a top chamber wall located in an upper portion and a bottom chamber wall located in a lower portion, and wherein the main shaft extends from the interior of the vacuum chamber through the top chamber wall to the exterior of the vacuum chamber.

6. The bonding device of claim 5, wherein guide shafts are provided on the top chamber wall and distributed uniformly around the main shaft, wherein a top of the main shaft is provided with an upper flange that is diametrically greater than the main shaft, and wherein the guide shafts are slidably engaged with the upper flange so that the main shaft is moveable up and down along the guide shafts.

7. The bonding device of claim 6, wherein the upper flange defines circular holes corresponding to the guide shafts, wherein the guide shafts are inserted through the circular holes, and wherein the guide shafts form clearance fits with the corresponding circular holes.

8. The bonding device of claim 6, wherein the main shaft defines a deep bore and is connected to the driving device by a tapered shaft screw that is disposed within the deep bore, and wherein the tapered shaft screw forms a clearance fit with the deep bore.

9. The bonding device of claim 8, wherein a screw nut is fixedly connected to an end face of the upper flange and has an internal thread that is engaged with the tapered shaft screw so that the screw nut is disposed over the tapered shaft screw in threaded fit.

10. The bonding device of claim 9, wherein a lower flange surrounding the main shaft is disposed on the top chamber wall, wherein the transmission device is provided with upper bellows that are fastened at one end to the upper flange and at the other end to the lower flange, and wherein each of the upper bellows has a radius smaller than a distance between a central axis of the main shaft and a central axis of any one of the guide shafts.

11. The bonding device of claim 9, wherein a thrust bearing is disposed over the tapered shaft screw between the driving device and the screw nut.

12. The bonding device of claim 1, wherein the driving device is a motor.