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17 KAWASAKI HEAVY INDUSTRIES, LTD.

18 UNITED STATES DISTRICT COURT
19 NORTHERN DISTRICT OF CALIFORNIA

21 KAWASAKI JUKOGYO KABUSHIKI
22 KAISHA,

23 Plaintiff,

24 v.

25 RORZE CORPORATION AND RORZE
AUTOMATION, INC.,

26 Defendants.

Case No. 3:22-cv-04974

**COMPLAINT FOR PATENT
INFRINGEMENT AND JURY DEMAND**

1 Plaintiff Kawasaki Jukogyo Kabushiki Kaisha, also known as Kawasaki Heavy Industries,
2 Ltd. (“KHI” or “Plaintiff”), brings this Complaint against Rorze Corporation (“RCO”) and Rorze
3 Automation, Inc. (“RAI”) (collectively “Rorze” or “Defendants”), and alleges as follows:

4 **NATURE OF THE ACTION**

5 1. This is a civil action for infringement of United States Reissue Patent Nos.
6 RE47,909, RE46,465, RE48,031, RE45,772 and RE47,145 and entitled “Wafer Transfer
7 Apparatus and Substrate Transfer Apparatus” (“the Patents”). True and correct copies of the
8 Patents are attached as Exhibits A, B, C, D and E, respectively. This action arises under the
9 patent laws of the United States, 35 U.S.C. § 1, *et seq.* Plaintiff seeks lost profits and/or a
10 reasonable royalty and injunction.

11 **THE PARTIES**

12 2. Plaintiff KHI is a Japanese corporation organized and existing under the laws of
13 Japan having its principal place of business at Kobe Crystal Tower, 1-1, Higashi-Kawasaki-cho 3-
14 chome, Chuo-ku, Kobe-shi, Hyogo 650-8670, Japan.

15 3. Upon information and belief, Defendant RCO is a Japanese corporation having its
16 principal place of business at 1588-2 Michinoue, Kannabe-cho, Fukuyama-shi, Hiroshima 720-
17 2104, Japan.

18 4. Upon information and belief, Defendant RAI is a California corporation having its
19 principal place of business at 41215 Albrae Street, Fremont, California 94538, U.S.A.

20 5. Upon information and belief, Defendants make, offer to sell, sell and/or import
21 wafer handling system products (the “Accused Products”), which infringe the Patents.

22 6. RAI is the only U.S.-based subsidiary of RCO, and RCO markets the Accused
23 Products in the United States through RAI. RCO, through RAI, has regular contact with its U.S.
24 customers. Upon information and belief, Defendants RCO and RAI are in regular contact
25 regarding the Accused Products, which are the subject of this Complaint.

26 **JURISDICTION AND VENUE**

27 7. This is an action for patent infringement arising under the Patent Laws of the
28 United States, Title 35 of the United States Code.

1 8. This Court has subject matter jurisdiction over the infringement action pursuant to
2 28 U.S.C. §§ 1331 and 1338(a).

3 9. Upon information and belief, Defendant RCO is subject to this Court's general and
4 specific personal jurisdiction because RCO has purposefully availed itself of the privileges of
5 conducting business in the State of California; RCO has sought protection and benefit from the
6 laws of the State of California; RCO conducts business within the State of California; RCO has
7 caused harm to Plaintiff within the State of California; and Plaintiff's causes of action arise
8 directly from RCO's contacts and other activities in at least the State of California.

9 10. Upon information and belief, Defendant RAI is subject to this Court's general and
10 specific personal jurisdiction because RAI has purposefully availed itself of the privileges of
11 conducting business in the State of California; RAI has sought protection and benefit from the
12 laws of the State of California; RAI conducts business within the State of California; RAI has
13 caused harm to Plaintiff within the State of California; and Plaintiff's causes of action arise
14 directly from RAI's contacts and other activities in at least the State of California. RAI is also
15 incorporated in California.

16 11. Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400.

17 12. Defendant RCO has committed acts of patent infringement in this district.

18 13. Defendant RAI has committed acts of patent infringement in this district.

19 14. Defendant RAI has maintained a regular and established place of business in this
20 district, which has a physical office at 41215 Albrae St, Fremont, California 94538.

21 15. Upon information and belief, Defendant RCO does not maintain any regular and
22 established place of business in the United States. Venue is therefore proper as to RCO in any
23 district in the United States.

24 **INTRADISTRICT ASSIGNMENT**

25 16. Because this action is an intellectual property action, an excepted category under
26 Civil Local Rule 3-2(c) and General Order No. 44, the action should be assigned on a district-
27 wide basis.

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THE ASSERTED PATENTS

1
2 17. U.S. Reissue Patent No. RE47,909 (“the RE909 Patent”) duly and legally reissued
3 on March 17, 2020. *See* Exhibit A.

4 18. U.S. Reissue Patent No. RE46,465 (“the RE465 Patent”) duly and legally reissued
5 on July 4, 2017. *See* Exhibit B.

6 19. U.S. Reissue Patent No. RE48,031 (“the RE031 Patent”) duly and legally reissued
7 on June 2, 2020. *See* Exhibit C.

8 20. U.S. Reissue Patent No. RE45,772 (“the RE772 Patent”) duly and legally reissued
9 on October 20, 2015. *See* Exhibit D.

10 21. U.S. Reissue Patent No. RE47,145 (“the RE145 Patent”) duly and legally reissued
11 on November 27, 2018. *See* Exhibit E.

12 22. Defendants have infringed at least the claims of the Patents identified below
13 (“Asserted Claims”). Each Asserted Claim of the Patents is valid and enforceable.

THE ACCUSED PRODUCTS

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15 23. The Accused Products include, for example, stockers, such as N2-BWS Series
16 shown in Exhibits F¹ and G², sorters and Equipment Front End Module (EFEM) products which
17 use the inventions covered by the Asserted Claims.

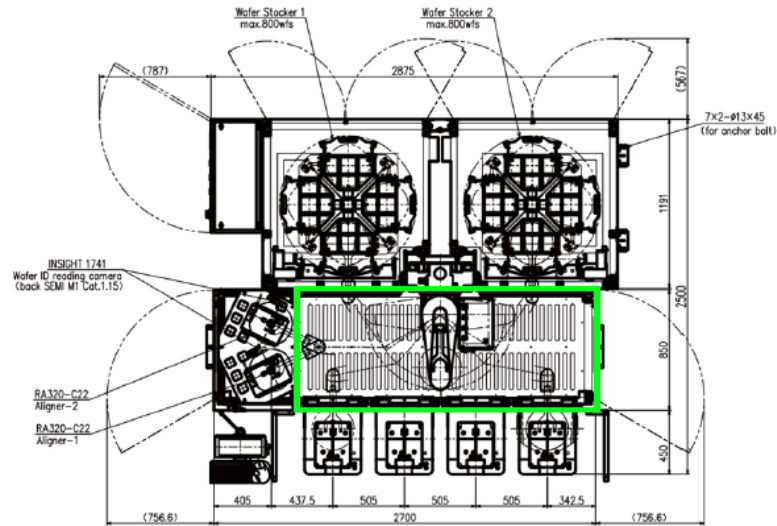
18 24. By way of example, claim 15 of the RE909 Patent includes “A wafer transfer
19 apparatus for transferring a wafer, comprising: an interface space forming portion defining an
20 interface space, the interface space forming portion having a front wall and a rear wall which are
21 arranged at a predetermined interval in forward and backward directions, the front wall having a
22 front opening formed therein, and the rear wall having a rear opening formed therein.”

23 25. This limitation is met by the N2-BWS1600 product, for example. As generally
24 shown below, the N2-BWS1600 product includes an interface space forming portion having a
25 front wall and a rear wall, and the front wall has a front opening and the rear wall has a rear
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27 ¹ Exhibit F is obtained from <https://www.rorze.com/en/products/n2-bws/>.

28 ² Exhibit G is obtained from https://www.rorze.com/en/wp-content/uploads/sites/2/2016/12/N2-BWS_EN.pdf.

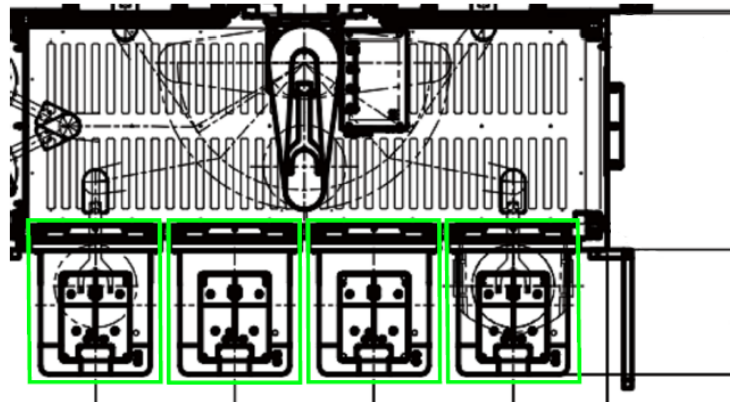
opening.



Ex. G annotated.

26. Claim 15 of the RE909 Patent further includes “a FOUP opener configured to open and close the substrate container located adjacent to the interface space and the front opening of the interface space forming portion.”

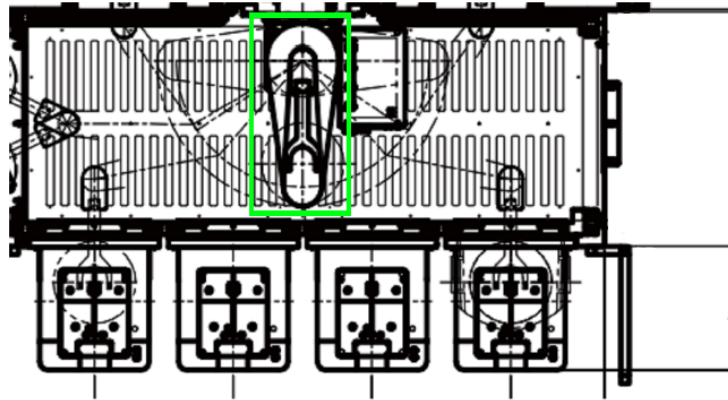
27. This limitation is met by the N2-BWS1600 product. As generally shown below, the N2-BWS1600 product has four FOUP openers. Each of the FOUP openers opens and closes the FOUP opener side door and the FOUP side door.



Ex. G annotated.

28. Claim 15 of the RE909 Patent further includes “a wafer carrying robot located in the interface space and configured to carry the wafer between the front opening and the rear opening.”

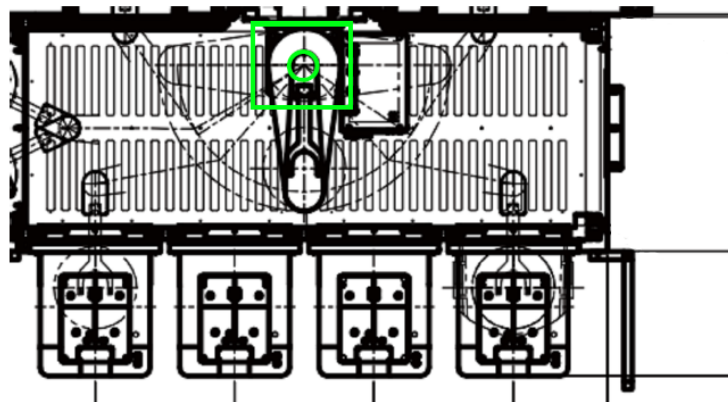
1 29. This limitation is met by the N2-BWS1600 product. As generally shown below,
2 the N2-BWS1600 product includes a wafer carrying robot.



10 Ex. G annotated.

11 30. Claim 15 of the RE909 Patent further includes “wherein the wafer carrying robot
12 includes: a base which is fixed to the interface space forming portion and at which a
13 predetermined pivot axis is set.”

14 31. This limitation is met by the N2-BWS1600 product. As generally shown below,
15 the N2-BWS1600 product includes a base fixed to the interface space forming portion and a pivot
16 axis.

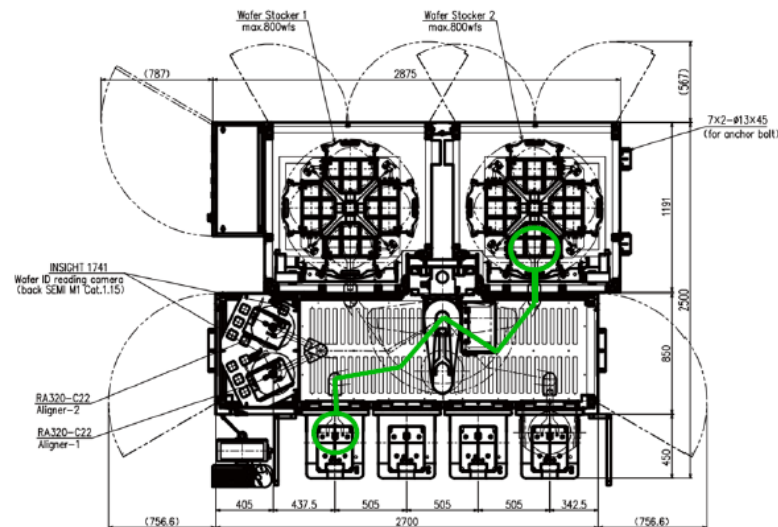


24 Ex. G annotated.

25 32. Claim 15 of the RE909 Patent further includes wherein the wafer carrying robot
26 includes “a robot arm having a proximal end and a distal end, the robot arm including a plurality
27 of link members connected with one another in succession in a direction from the proximal end to
28 the distal end, the proximal end being connected with the base, the distal end being provided with

1 a robot hand for holding the wafer, the robot arm being configured to be angularly displaced
2 about the pivot axis.”

3 33. The N2-BWS1600 product meets this limitation. As generally shown below, the
4 N2-BWS1600 product has a robot arm, angularly displaced about the pivot axis, which includes a
5 plurality of link members connected with one another in succession from the proximal end to the
6 distal end, in which the proximal end is connected with the base, and the distal end is provided
7 with a robot hand for holding a wafer. *See* also Ex. G (main specifications).



17 Ex. G annotated.

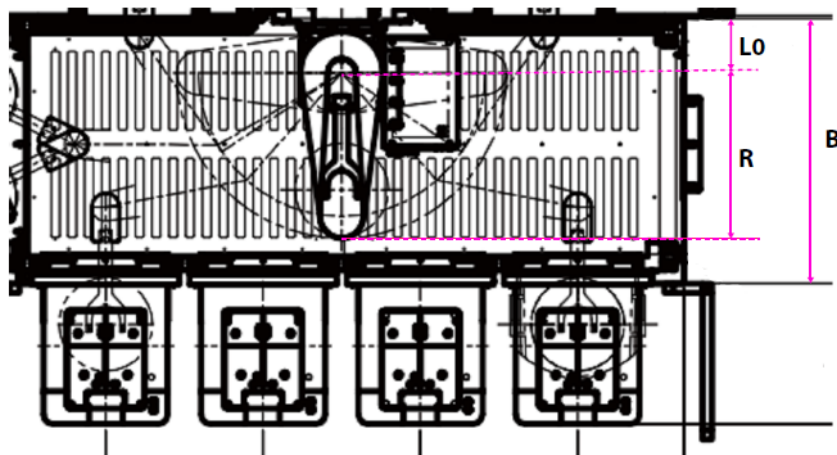
18 34. Claim 15 of the RE909 Patent further includes “a drive unit configured to drive
19 each of the link members of the robot arm so that the link members are angularly displaced,
20 individually, about each corresponding axis.”

21 35. The N2-BWS1600 product meets this limitation. The N2-BWS1600 product
22 includes a drive unit for moving the link members of the robot arm individually about each
23 corresponding axis. *See* Rorze Taiwan. “RORZE Taiwan 樂華科技 2016 年產品影片-Sorter.”
24 *YouTube*, Sep. 8, 2016, <https://www.youtube.com/watch?v=a1xvOJqsH0E> (last visited Aug. 29,
25 2022) (“Rorze Video”). The Rorze Video shows that the link members of the robot arm are
26 moved individually about each corresponding axis.

27 36. Claim 15 of the RE909 Patent further includes “wherein, in a minimum
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1 transformed state where the robot arm is transformed such that a distance defined from the pivot
 2 axis to an arm portion which is farthest in a radial direction relative to the pivot axis is minimum,
 3 a minimum rotation radius R , as the distance defined from the pivot axis to the arm portion which
 4 is the farthest in the radial direction relative to the pivot axis, is set to exceed $1/2$ of a length B in
 5 the forward and backward directions of the interface space, the length B corresponding to a length
 6 between the front wall and the rear wall of the interface space forming portion, and is further set
 7 to be equal to or less than a subtracted value $(B-L_0)$ to be obtained by subtracting a distance L_0 in
 8 the forward and backward directions from the rear wall of the interface space forming portion to
 9 the pivot axis, from the length B in the forward and backward directions of the interface space
 10 (i.e., $B/2 < R \leq B-L_0$).”

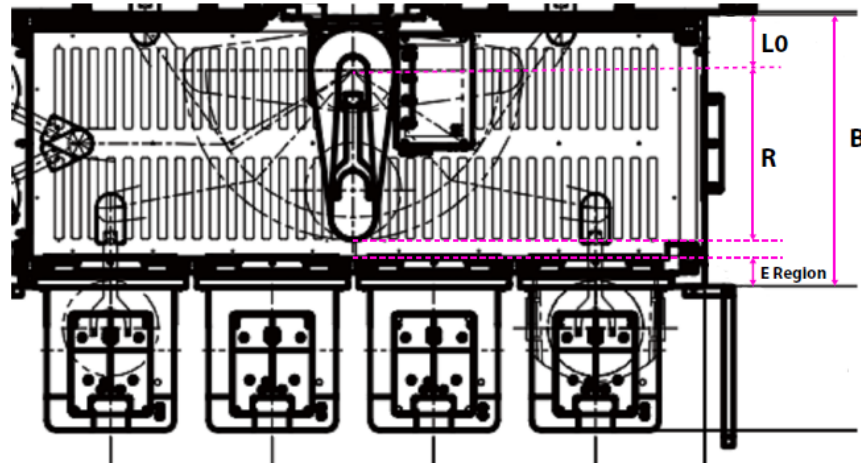
11 37. The N2-BWS1600 product meets this limitation. The figure as generally shown
 12 below confirms that the N2-BWS1600 product satisfies $B/2 < R \leq B-L_0$.



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21 Ex. G annotated.

22 38. Lastly, claim 15 of the RE909 Patent includes “the minimum rotation radius R is
 23 set to be equal to or less than an allowable length $(B-L_0-E)$ to be obtained by subtracting the
 24 distance L_0 in the forward and backward directions from the rear wall of the interface space
 25 forming portion to the pivot axis and a length E of a robot invasion restricted region, which is set
 26 for the FOUP opener and is measured from the front wall in the forward and backward directions
 27 toward the rear wall, from the length B in the forward and backward directions of the interface
 28 space (i.e., $R \leq B-L_0-E$).”

1 39. The length E of each of the robot invasion restricted regions is set for the FOUP
 2 opener and located in the E Region as generally shown in the figure below. The figure below
 3 confirms that the minimum rotation radius R of the N2-BWS1600 product satisfies the claim
 4 limitation of $R \leq B - L_0 - E$.

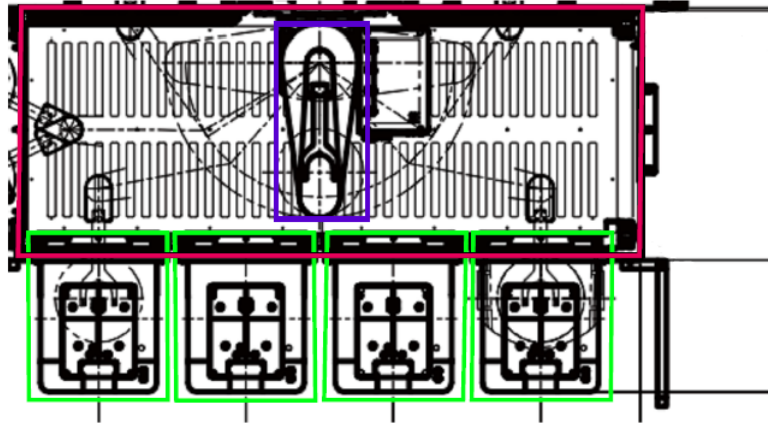


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13 Ex. G annotated.

14 40. By way of further example, claim 15 of the RE465 Patent includes “A wafer
 15 carrying robot configured to be used for a wafer transfer apparatus, the wafer transfer apparatus
 16 having a front wall, a rear wall and a FOUP opener, the front wall having a front opening, the
 17 FOUP opener being used for opening and closing the front opening.”

18 41. As generally shown below, the N2-BWS1600 product, for example, has a wafer
 19 carrying robot (blue), the wafer transfer apparatus having a front wall and a rear wall (red), and
 20 FOUP openers (green). Each of the FOUP openers opens and closes the FOUP opener side door
 21 and the FOUP side door.

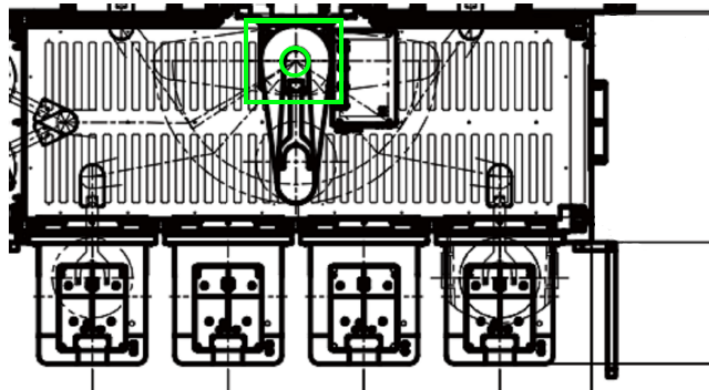
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Ex. G annotated.

42. Claim 15 of the RE465 Patent further includes “a base on which a predetermined pivot axis is set.”

43. This limitation is met by the N2-BWS1600 product. As generally shown below, the N2-BWS1600 product includes a base on which a predetermined pivot axis is set.

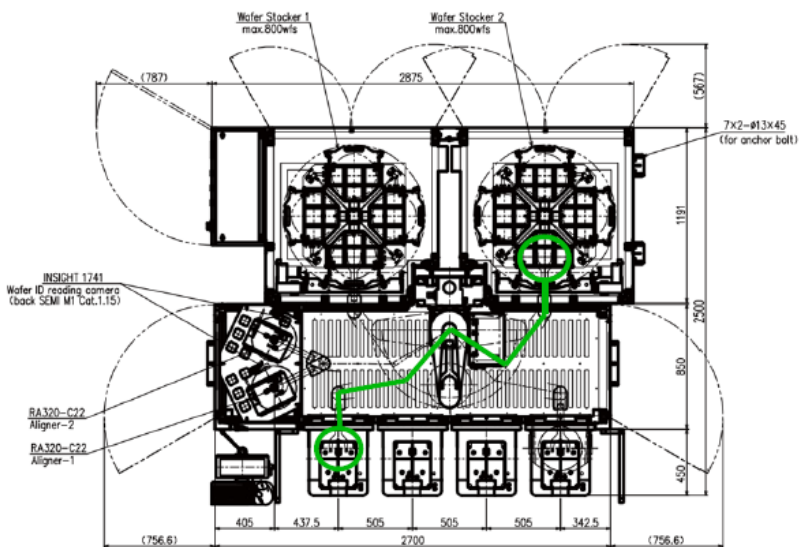


Ex. G annotated.

44. Claim 15 of the RE465 Patent further includes “a robot arm, the robot arm including a plurality of link members connected with one another in succession in a direction from a proximal end to a distal end, the proximal end being connected with the base, the distal end being configured to hold a robot hand that holds the wafer, the robot arm being configured to be angularly displaced about the pivot axis.”

45. The N2-BWS1600 product meets this limitation. As generally shown below, the N2-BWS1600 product has a robot arm, angularly displaced about the pivot axis, which includes a

1 plurality of link members connected with one another in succession from the proximal end to the
 2 distal end, in which the proximal end is connected with the base, and the distal end is provided
 3 with a robot hand for holding a wafer. See also Ex. G (main specifications).



13 Ex. G annotated.

14 46. Claim 15 of the RE465 Patent further includes “a drive unit configured to drive the
 15 robot arm.”

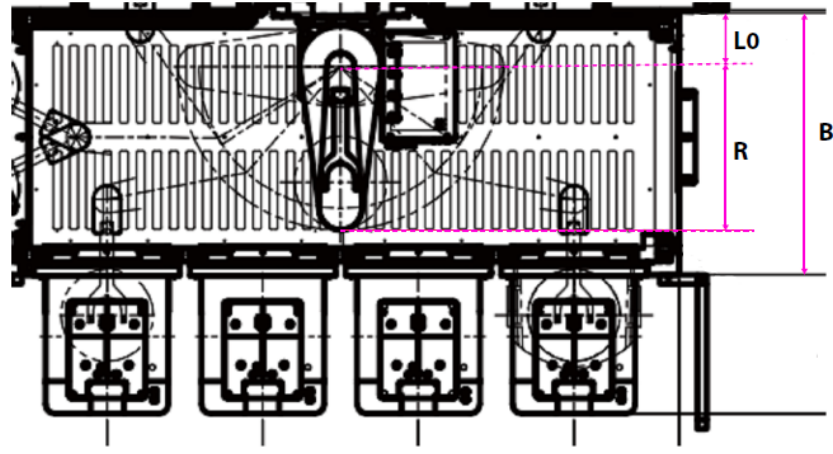
16 47. The N2-BWS1600 product meets this limitation. The N2-BWS1600 product
 17 includes a drive unit for moving the link members of the robot arm individually about each
 18 corresponding axis. See Rorze Video (showing that the link members of the robot arm are moved
 19 individually about each corresponding axis).

20 48. Claim 15 of the RE465 Patent further includes “wherein, in a minimum
 21 transformed state where the robot arm is transformed such that a distance defined from the pivot
 22 axis to an arm portion which is farthest in a radial direction relative to the pivot axis is minimum,
 23 a minimum rotation radius R, as the distance defined from the pivot axis to the arm portion which
 24 is the farthest in the radial direction relative to the pivot axis, is set to exceed 1/2 of a length B,
 25 the length B corresponding to a length between the front wall and the rear wall (i.e., $B/2 < R$).”

26 49. The N2-BWS1600 product meets this limitation. The figure as generally shown
 27 below confirms that the N2-BWS1600 product satisfies $B/2 < R$.

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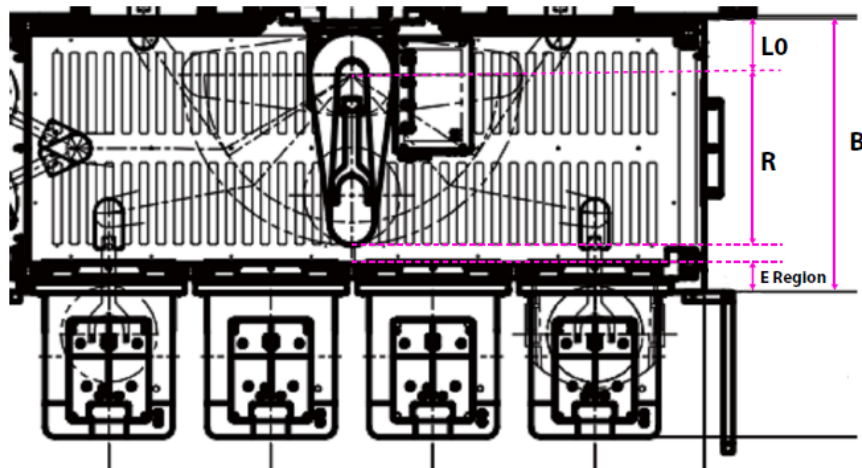
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Ex. G annotated.

50. Lastly, claim 15 of the RE465 Patent further includes “the minimum rotation radius R is set to be equal to or less than an allowable length $(B-L0-E)$ to be obtained by subtracting the distance $L0$ in the forward and backward directions from the rear wall to the pivot axis and a length E of a robot invasion restricted region, which is determined by the FOUP opener and is measured from the front wall in the forward and backward directions toward the rear wall, from the length B (i.e., $R \leq B-L0-E$).”

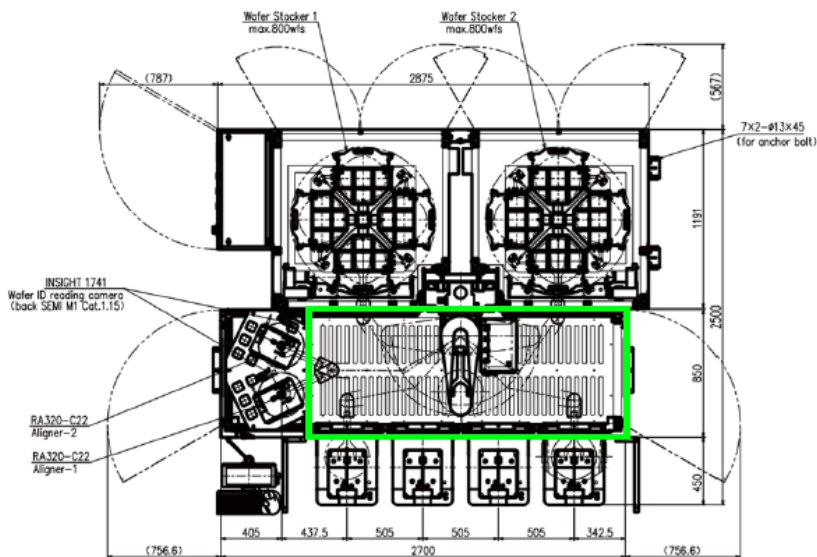
51. The length E of each of the robot invasion restricted regions is set for the FOUP opener and located in the E Region as generally shown in the figure below. The figure below confirms that the minimum rotation radius R of the N2-BWS1600 product satisfies the claims limitation of $R \leq B-L0-E$.



Ex. G annotated.

1 52. By way of further example, claim 29 of the RE031 Patent includes “A substrate
 2 transfer apparatus for transferring a substrate, comprising: an interface space forming portion
 3 defining an interface space, the interface space forming portion having a front wall and a rear wall
 4 which are arranged at a predetermined interval in forward and backward directions, the front wall
 5 having a front opening formed therein, a front face plate constituting part of the front wall, and
 6 the rear wall having a rear opening formed therein.”

7 53. This limitation is met by the N2-BWS1600 product, for example. As generally
 8 shown below, the N2-BWS1600 product includes an interface space forming portion having a
 9 front wall and a rear wall, and the front wall has a front opening and the rear wall has a rear
 10 opening.

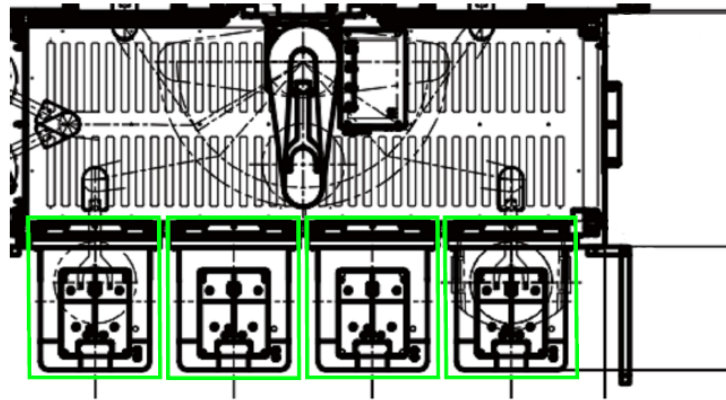


11 Ex. G annotated.

12 54. Claim 29 of the RE031 Patent further recites “a FOUP opener including an opener-
 13 side door, the FOUP opener being configured to open and close a substrate container which
 14 includes a FOUP-side door and is located adjacent to the interface space and the front opening of
 15 the interface space forming portion, the FOUP opener being configured to open and close the
 16 opener-side door and the FOUP-side door.”

17 55. This limitation is met by the N2-BWS1600 product. As generally shown below,
 18 the N2-BWS1600 product has four FOUP openers located adjacent to the interface space and the
 19 front opening of the interface space forming portion. Each of the FOUP openers opens and closes
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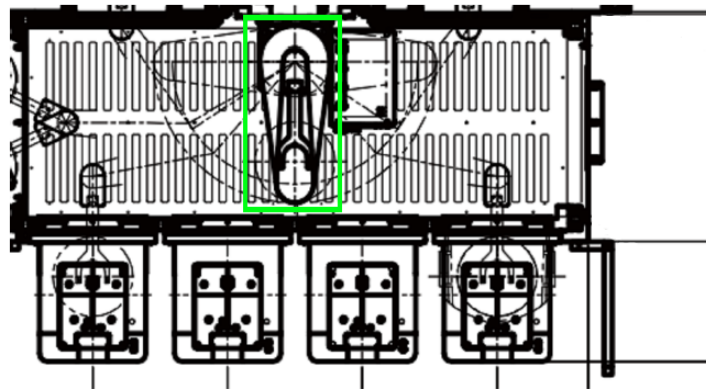
1 the FOUP opener side door and the FOUP side door.



9 Ex. G annotated.

10 56. Claim 29 of the RE031 Patent further includes “a substrate carrying robot located
11 in the interface space and configured to carry the substrate between the front opening and the rear
12 opening.”

13 57. This limitation is met by the N2-BWS1600 product. As generally shown below,
14 the N2-BWS1600 product has a substrate carrying robot located in the interface space, which
15 carries a substrate between the front opening and the rear opening.”

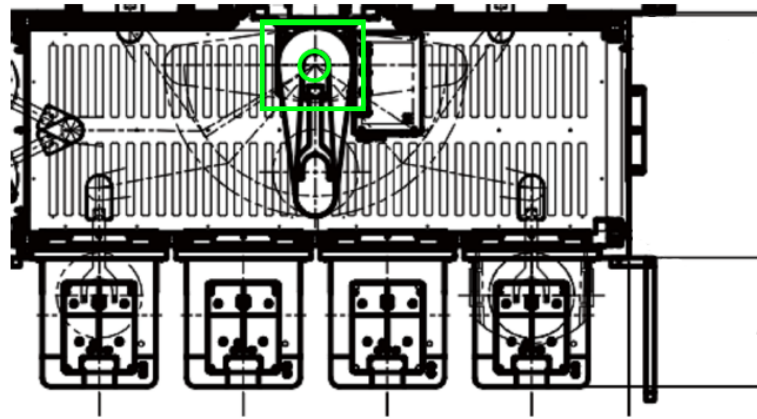


23 Ex. G annotated.

24 58. Claim 29 of the RE031 Patent further includes “wherein the substrate carrying
25 robot includes: a base which is located in the interface space and at which a predetermined pivot
26 axis is set.”

27 59. This limitation is met by the N2-BWS1600 product. As generally shown below,
28 the N2-BWS1600 product includes a base fixed to the interface space forming portion and a pivot

1 axis.

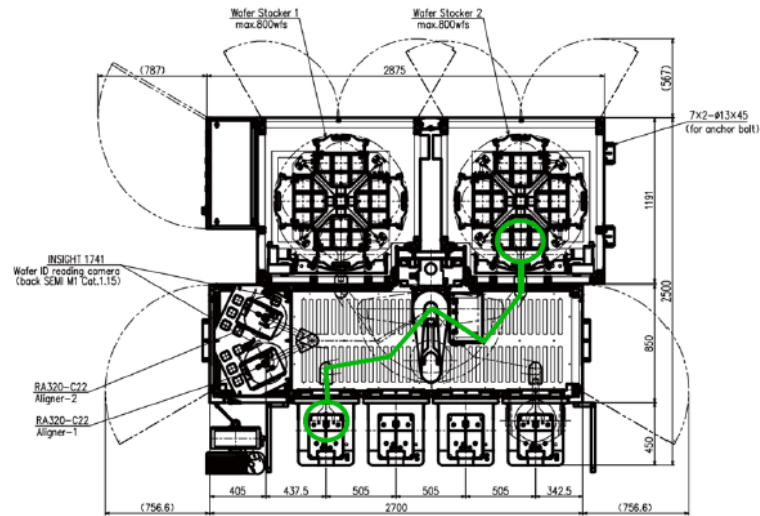


9 Ex. G annotated.

10 60. Claim 29 of the RE031 Patent further includes “a robot arm having a proximal end
11 and a distal end, the robot arm including a plurality of link members connected with one another
12 in succession in a direction from the proximal end to the distal end, the proximal end being
13 connected with the base, the distal end being provided with a robot hand for holding the substrate,
14 the robot arm being configured to be angularly displaced about the pivot axis.”

15 61. The N2-BWS1600 product meets this limitation. As generally shown below, the
16 N2-BWS1600 product has a robot arm, angularly displaced about the pivot axis, which includes a
17 plurality of link members connected with one another in succession from the proximal end to the
18 distal end, in which the proximal end is connected with the base, and the distal end is provided
19 with a robot hand for holding a wafer. *See* also Ex. G (main specifications).

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Ex. G annotated.

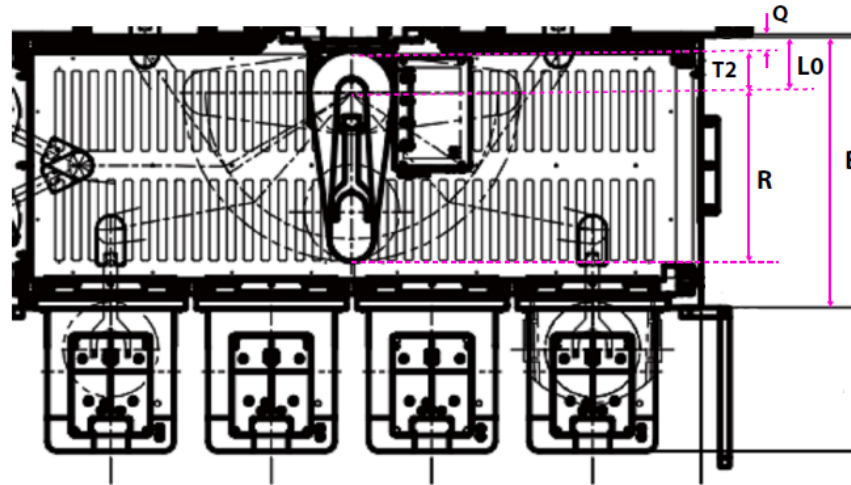
62. Claim 29 of the RE031 Patent further includes “a drive unit configured to drive each of the link members of the robot arm so that the link members are angularly displaced, individually, about each corresponding axis.”

63. The N2-BWS1600 product meets this limitation. The N2-BWS1600 product includes a drive unit for moving the link members of the robot arm individually about each corresponding axis. *See Rorze Video* (showing that the link members of the robot arm are moved individually about each corresponding axis).

64. Claim 29 of the RE031 Patent further includes “wherein, in a minimum transformed state where the robot arm is transformed such that a distance defined from the pivot axis to an arm portion which is farthest in a radial direction relative to the pivot axis is minimum, a minimum rotation radius R , as the distance defined from the pivot axis to the arm portion which is the farthest in the radial direction relative to the pivot axis, is set to exceed $1/2$ of a length B in the forward and backward directions of the interface space, the length B corresponding to a length between the front wall and the rear wall of the interface space forming portion, and is further set to be equal to or less than a subtracted value $(B-L_0)$ to be obtained by subtracting a distance L_0 set to be greater by a predetermined gap length Q than a radius T_2 of an outer surface of a first link member of the plurality of link members about the pivot axis $(L_0=T_2+Q)$, from the length B

1 in the forward and backward directions of the interface space (i.e., $B/2 < R \leq B - L_0$.)”

2 65. This limitation is met by the N2-BWS1600 product. As generally shown below,
 3 the N2-BWS1600 product satisfies $L_0 = Q + T_2$. Further, the figure below confirms that the N2-
 4 BWS1600 product satisfies $B/2 < R \leq B - L_0$.

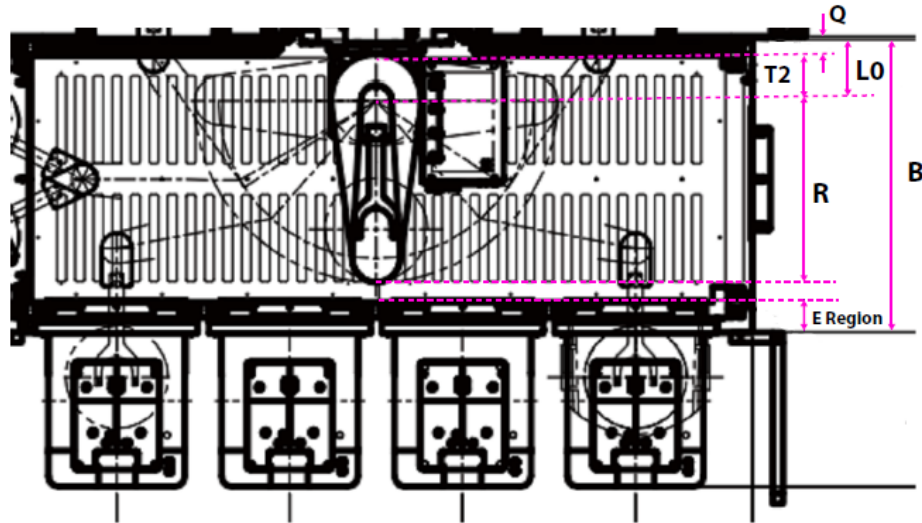


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12 Ex. G annotated.

13 66. Claim 29 of the RE031 Patent further includes “the minimum rotation radius R is
 14 set to be equal to or less than an allowable length ($B - L_0 - E$) to be obtained by subtracting the
 15 distance L_0 and a length E of a robot invasion restricted region, which is set for the FOUP opener
 16 and is measured from the front face plate in the forward and backward directions toward the rear
 17 wall, from the length B in the forward and backward directions of the interface space (i.e., $R \leq B -$
 18 $L_0 - E$.)”

19 67. The length E of each of the robot invasion restricted regions is set for the FOUP
 20 opener and located in the E Region as generally shown in the figure below. The figure below
 21 confirms that the minimum rotation radius R of the N2-BWS1600 product satisfies the claim
 22 limitation of $R \leq B - L_0 - E$.
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Ex. G annotated.

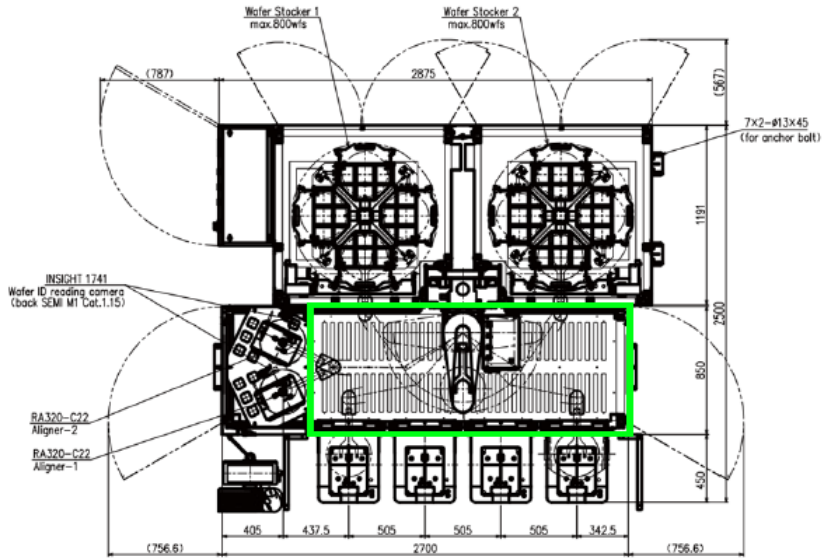
68. Lastly, claim 29 of the RE031 Patent includes “the robot invasion restricted region is defined by a movable region in which the opener-side door and the FOUP-side door move relative to the substrate container.”

69. This limitation is met by the N2-BWS1600 product. In the N2-BWS1600 product, as shown in the Rorze video, the FOUP opener side door and the FOUP side door move relative to the FOUP to define a robot invasion restricted region.

70. By way of further example, claim 1 of the RE772 Patent includes “A wafer transfer apparatus for transferring a wafer, comprising: an interface space forming portion defining an interface space, the interface space forming portion having a front wall and a rear wall which are arranged at a predetermined interval in forward and backward directions, the front wall having a front opening formed therein, and the rear wall having a rear opening formed therein.”

71. This limitation is met by the N2-BWS1600 product, for example. As generally shown below, the N2-BWS1600 product includes an interface space forming portion having a front wall and a rear wall, and the front wall has a front opening formed therein and the rear wall has a rear opening formed therein.

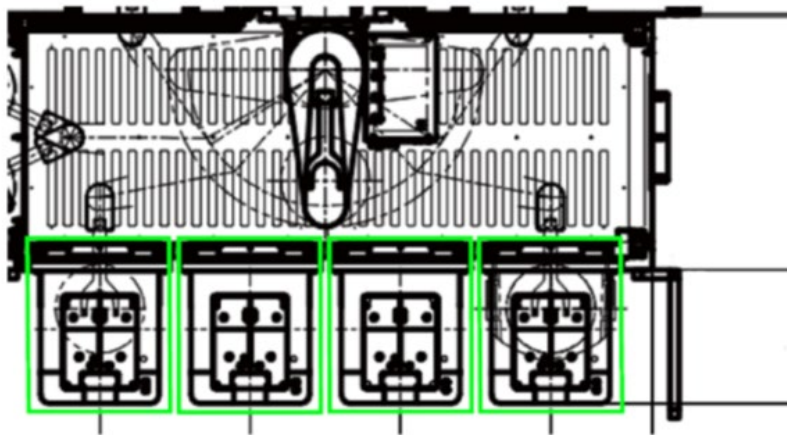
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Ex. G annotated.

72. Claim 1 of the RE772 Patent further includes “a FOUP opener configured to open and close the substrate container located adjacent to the interface space and the front opening of the interface space forming portion.”

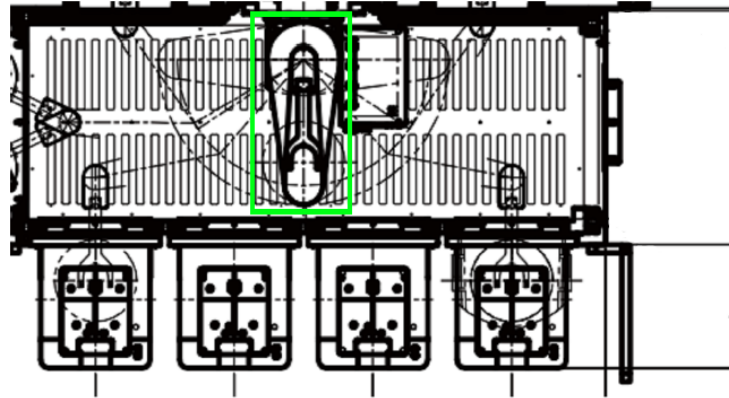
73. This limitation is met by the N2-BWS1600 product. As generally shown below, the N2-BWS1600 product has four FOUP openers located adjacent to the interface space and the front opening of the interface space forming portion. Each of the FOUP openers opens and closes the opener side door and the FOUP side door.



Ex. G annotated.

1 74. Claim 1 of the RE772 Patent further includes “a wafer carrying robot located in the
 2 interface space and configured to carry the wafer between the front opening and the rear
 3 opening.”

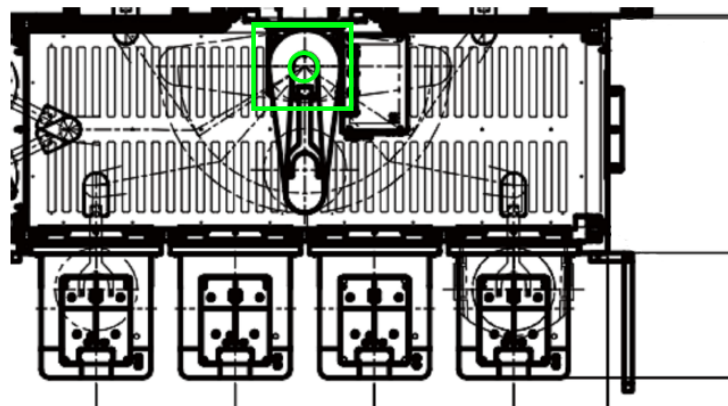
4 75. This limitation is met by the N2-BWS1600 product. As generally shown below,
 5 the N2-BWS1600 product includes a wafer carrying robot that is located in the interface space,
 6 which carries a wafer between the front opening and the rear opening.



14 Ex. G annotated.

15 76. Claim 1 of the RE772 Patent further includes “a base which is fixed to the
 16 interface space forming portion and at which a predetermined pivot axis is set.”

17 77. This limitation is met by the N2-BWS1600 product. As generally shown below,
 18 the N2-BWS1600 product includes a base fixed to the interface space forming portion and a pivot
 19 axis.

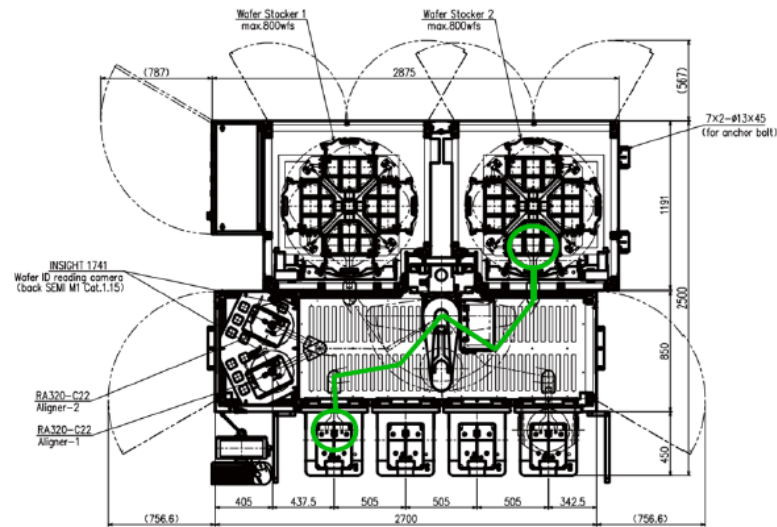


27 Ex. G annotated.

28 78. Claim 1 of the RE772 Patent further includes “a robot arm having a proximal end

1 and a distal end, the robot arm including a plurality of link members connected with one another
 2 in succession in a direction from the proximal end to the distal end, the proximal end being
 3 connected with the base, the distal end being provided with a robot hand for holding the wafer,
 4 the robot arm being configured to be angularly displaced about the pivot axis.”

5 79. The N2-BWS1600 product meets this limitation. As generally shown below, the
 6 N2-BWS1600 product has a robot arm, angularly displaced about the pivot axis, which includes a
 7 plurality of link members connected with one another in succession from the proximal end to the
 8 distal end, in which the proximal end is connected with the base, the distal end is provided with a
 9 robot hand for holding a wafer. *See also* Ex. G (main specifications).



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18 Ex. G annotated.

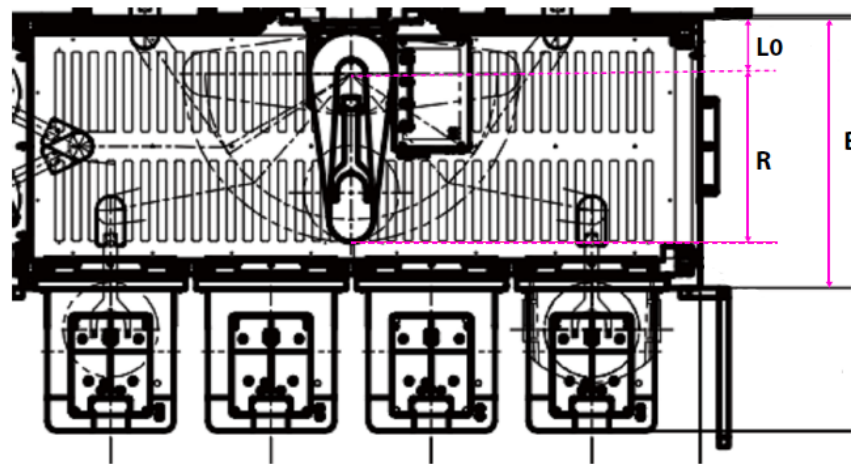
19 80. Claim 1 of the RE772 Patent further includes “a drive unit configured to drive
 20 each of the link members of the robot arm so that the link members are angularly displaced,
 21 individually, about each corresponding axis.”

22 81. The N2-BWS1600 product meets this limitation. The N2-BWS1600 product
 23 includes a drive unit for moving the link members of the robot arm individually about each
 24 corresponding axis. *See* Rorze Video (showing that the link members of the robot arm are moved
 25 individually about each corresponding axis).

26 82. Claim 1 of the RE772 Patent further includes “wherein, in a minimum transformed
 27 state where the robot arm is transformed such that a distance defined from the pivot axis to an
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1 arm portion which is farthest in a radial direction relative to the pivot axis is minimum, a
 2 minimum rotation radius R , as the distance defined from the pivot axis to the arm portion which
 3 is the farthest in the radial direction relative to the pivot axis, is set to exceed $1/2$ of a length B in
 4 the forward and backward directions of the interface space, the length B corresponding to a length
 5 between the front wall and the rear wall of the interface space forming portion, and is further set
 6 to be equal to or less than a subtracted value $(B-L_0)$ to be obtained by subtracting a distance L_0 in
 7 the forward and backward directions from the rear wall of the interface space forming portion to
 8 the pivot axis, from the length B in the forward and backward directions of the interface space
 9 (i.e., $B/2 < R \leq B-L_0$).”

10 83. The N2-BWS1600 product meets this limitation as shown below. The figure as
 11 generally shown below confirms that the N2-BWS1600 product satisfies $B/2 < R \leq B-L_0$.

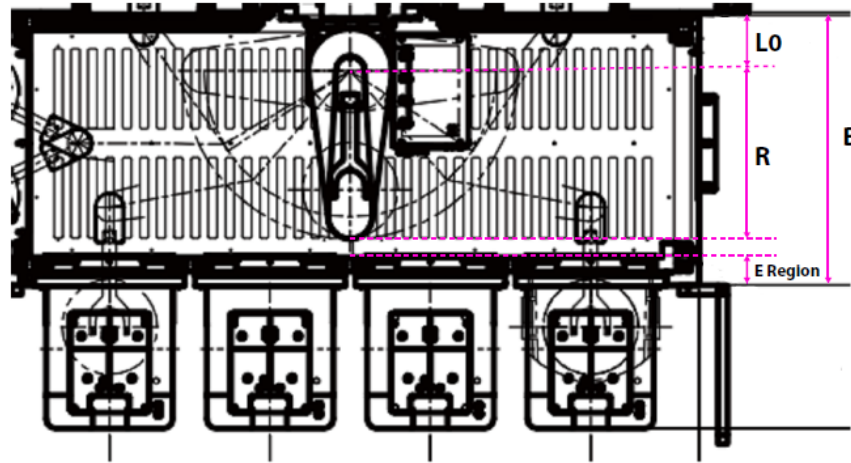


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20 Ex. G annotated.

21 84. Claim 1 of the RE772 Patent further includes “the minimum rotation radius R is
 22 set to be equal to or less than an allowable length $(B-L_0-E)$ to be obtained by subtracting the
 23 distance L_0 in the forward and backward directions from the rear wall of the interface space
 24 forming portion to the pivot axis and a length E of a robot invasion restricted region, which is set
 25 for the FOUP opener and is measured from the front wall in the forward and backward directions
 26 toward the rear wall, from the length B in the forward and backward directions of the interface
 27 space (i.e., $R \leq B-L_0-E$).”

28 85. The length E of each of the robot invasion restricted regions is set for the FOUP

1 opener and located in the E Region as generally shown in the figure below. The figure below
 2 confirms that the minimum rotation radius R of the N2-BWS1600 product satisfies the claim
 3 limitation of $R \leq B - L_0 - E$.



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11 Ex. G annotated.

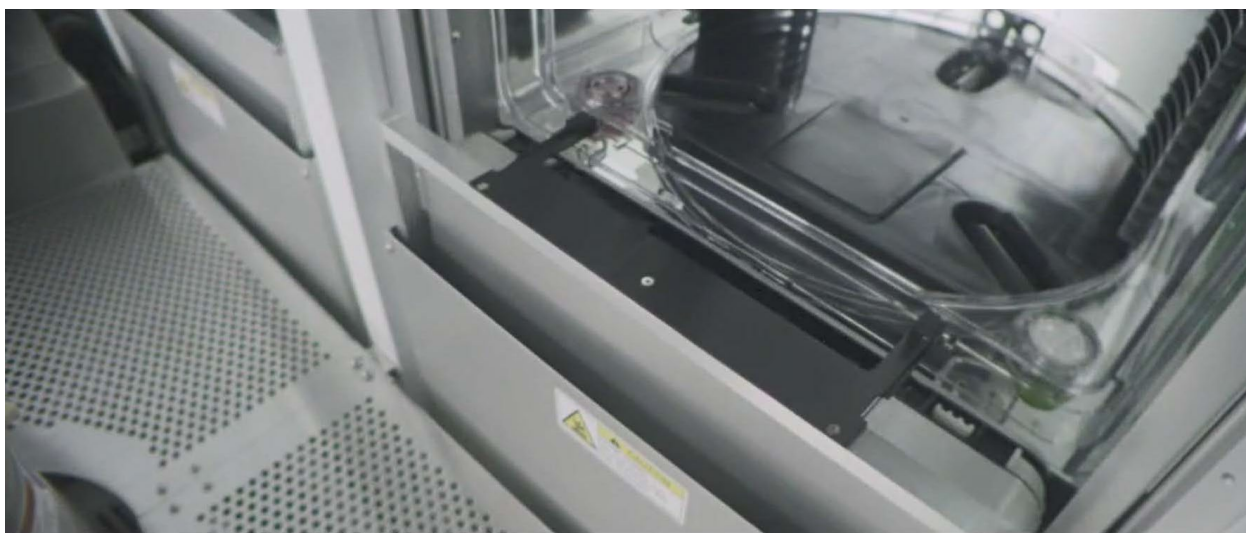
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13 86. Lastly, claim 1 of the RE772 Patent includes “wherein the robot invasion restricted
 14 region is defined by a distance which the FOUP opener moves in the forward and backward
 15 directions of the interface space, wherein the FOUP opener opens and closes an opener-side door
 16 and a FOUP-side door.”

17 87. The N2-BWS1600 product meets this limitation. For example, the FOUP opener
 18 of the N2-BWS1600 product moves in the forward and backward directions to thereby define
 19 robot invasion restricted regions, which are measurable in the forward and backward directions,
 20 as shown, for example, by the pictures below captured from the Rorze Video.

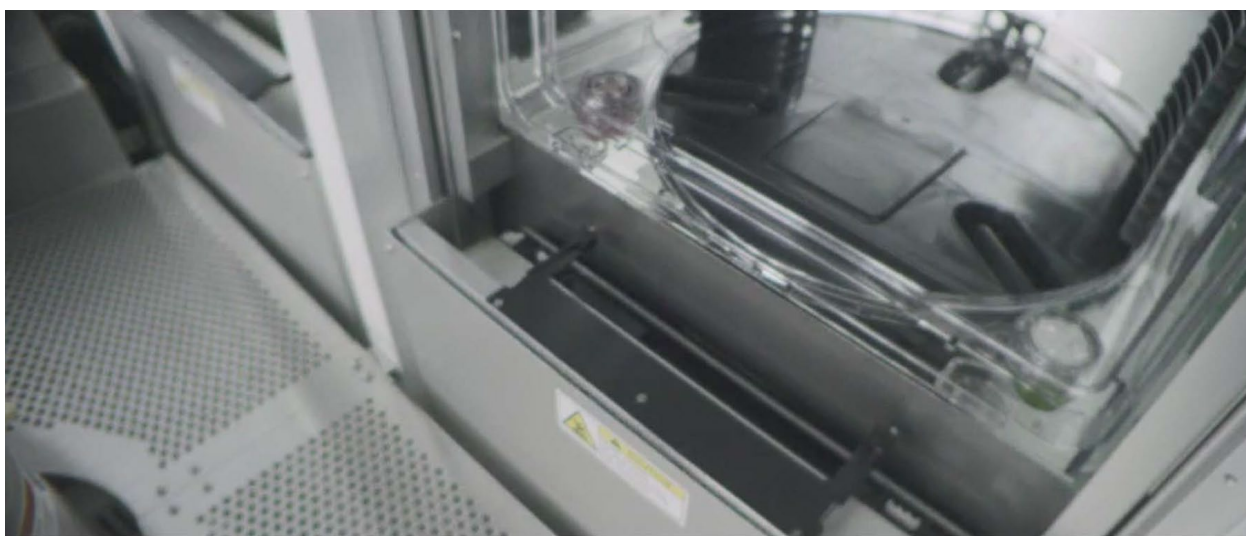
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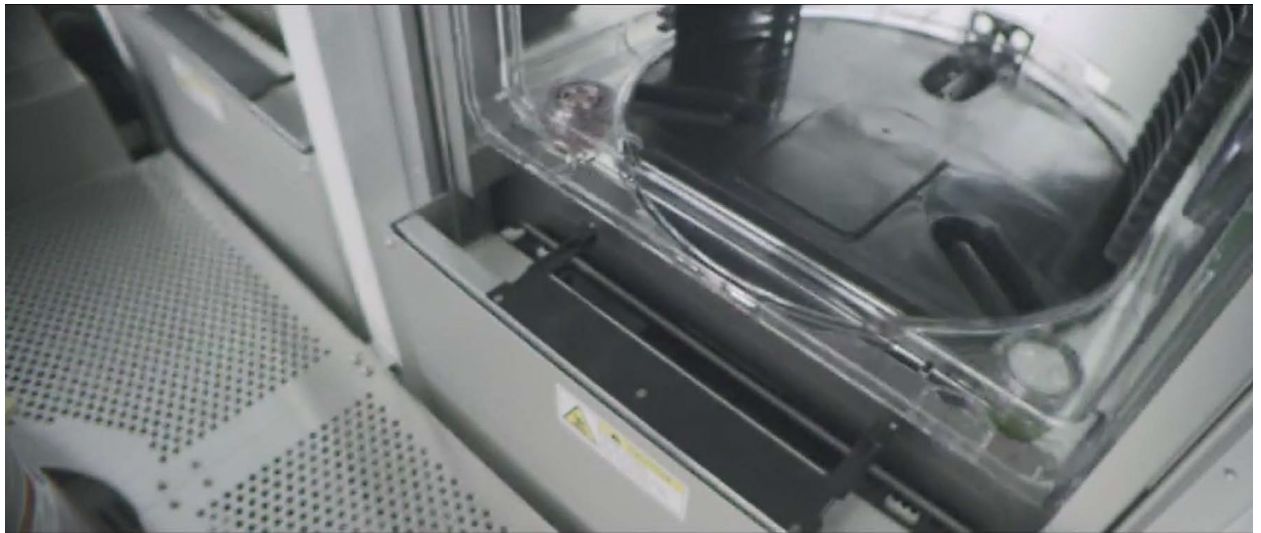
Rorze Video, around 35 secs.



Id., around 35 secs.



1 *Id.*, around 37 secs.



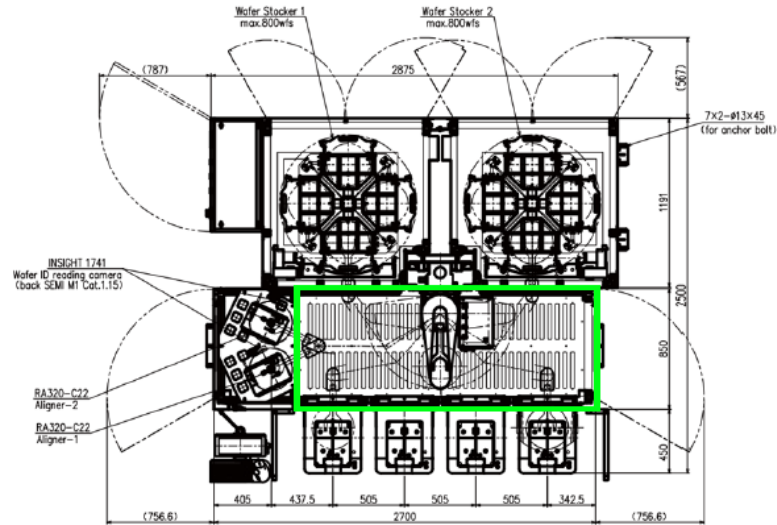
11 *Id.*, around 37 secs.

12 88. Also, The FOUP opener of the N2-BWS1600 product opens and closes the opener
13 side door and the FOUP-side door.

14 89. By way of further example, claim 17 (which depends from claim 15) of the RE145
15 Patent includes “A wafer transfer apparatus for transferring a wafer, comprising: an interface
16 space forming portion defining an interface space, the interface space forming portion having a
17 front wall and a rear wall which are arranged at a predetermined interval in forward and backward
18 directions, the front wall having a front opening formed therein, and the rear wall having a rear
19 opening formed therein.”

20 90. This limitation is met by the N2-BWS1600 product, for example. As generally
21 shown below, the N2-BWS1600 product includes an interface space forming portion having a
22 front wall and a rear wall, and the front wall has a front opening formed therein and the rear wall
23 has a rear opening formed therein.

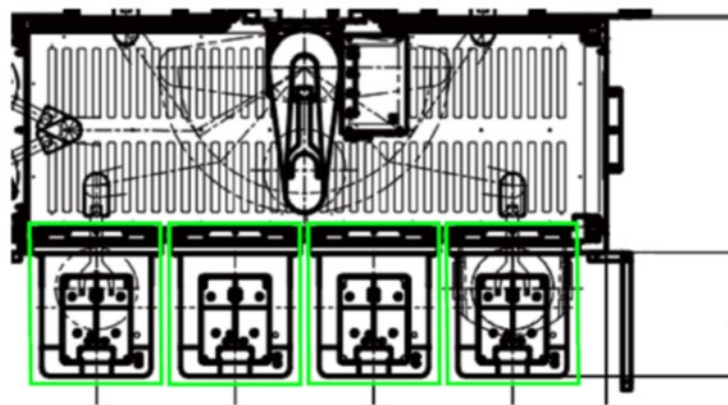
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Ex. G annotated.

91. Claim 17 (which depends from claim 15) of the RE145 Patent further includes “a FOUP opener configured to open and close a wafer container located adjacent to the interface space and the front opening of the interface space forming portion.”

92. This limitation is met by the N2-BWS1600 product. As generally shown below, the N2-BWS1600 product has four FOUP openers located adjacent to the interface space and the front opening of the interface space forming portion. Each of the FOUP openers opens and closes the FOUP opener side door and the FOUP side door.

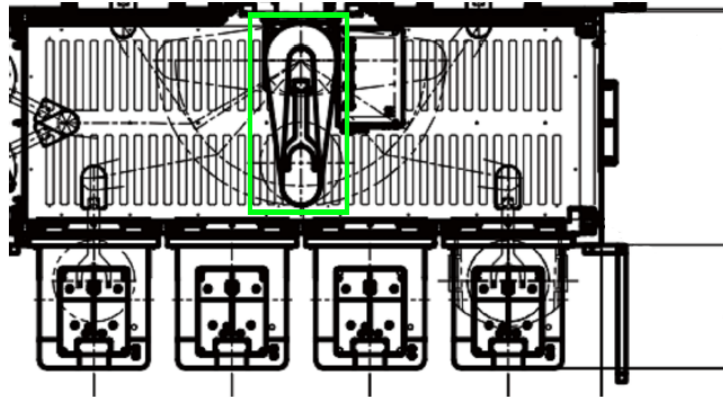


Ex. G annotated.

93. Claim 17 (which depends from claim 15) of the RE145 Patent further includes “a wafer carrying robot located in the interface space and configured to carry the wafer between the

1 front opening and the rear opening.”

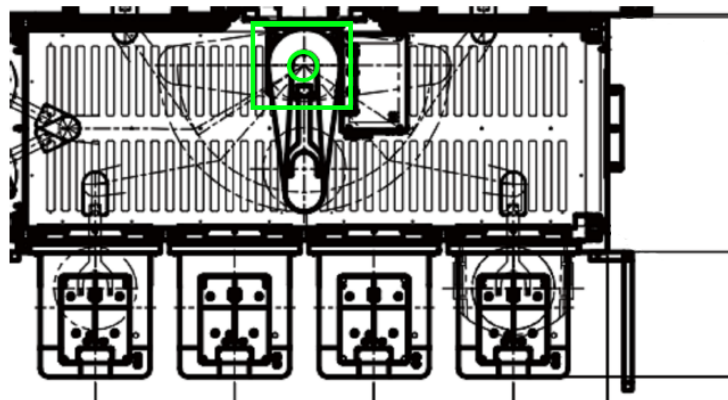
2 94. The N2-BWS1600 product meets this limitation. As generally shown below, the
3 N2-BWS1600 product has a wafer carrying robot located in the interface space, which carries a
4 wafer between the front opening and the rear opening. *See* also Ex. G (main specifications).



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11 Ex. G annotated.

12 95. Claim 17 (which depends from claim 15) of the RE145 Patent further includes
13 wherein the wafer carrying robot includes: “a base which is fixed to the interface space forming
14 portion and at which a predetermined pivot axis is set.”

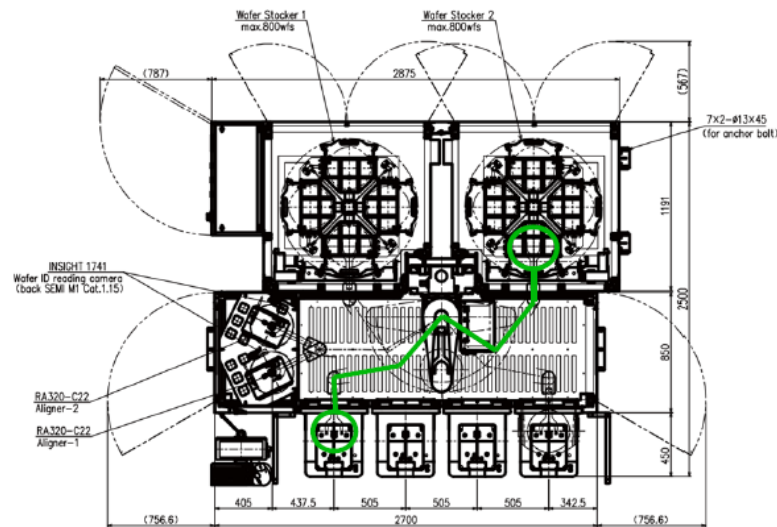
15 96. This limitation is met by the N2-BWS1600 product. As generally shown below,
16 the N2-BWS1600 product includes a base on which a predetermined pivot axis is set.
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24 Ex. G annotated.

1 97. Claim 17 (which depends from claim 15) of the RE145 Patent further includes “a
 2 robot arm having a proximal end and a distal end, the robot arm including a plurality of link
 3 members connected with one another in succession in a direction from the proximal end to the
 4 distal end, the proximal end being connected with the base, the distal end being provided with a
 5 robot hand for holding the wafer, the robot arm being configured to be angularly displaced about
 6 the pivot axis.”

7 98. The N2-BWS1600 product meets this limitation. As generally shown below, the
 8 N2-BWS1600 product has a robot arm, angularly displaced about the pivot axis, which includes a
 9 plurality of link members connected with one another in succession from the proximal end to the
 10 distal end, in which the proximal end is connected with the base, and the distal end is provided
 11 with a robot hand for holding a wafer. *See* also Ex. G (main specifications).



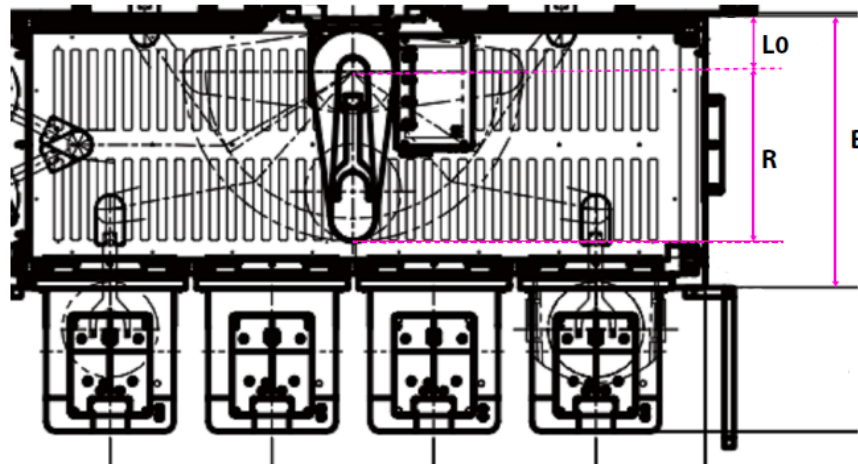
21 Ex. G annotated.

22 99. Claim 17 (which depends from claim 15) of the RE145 Patent further includes “a
 23 drive unit configured to drive the robot arm.”

24 100. The N2-BWS1600 product meets this limitation. The N2-BWS1600 product
 25 includes a drive unit for moving the link members of the robot arm individually about each
 26 corresponding axis. *See* Rorze Video (showing that the link members of the robot arm are moved
 27 individually about each corresponding axis).
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1 101. Claim 17 (which depends from claim 15) of the RE145 Patent further includes
 2 “wherein, in a minimum transformed state where the robot arm is transformed such that a
 3 distance defined from the pivot axis to an arm portion which is farthest in a radial direction
 4 relative to the pivot axis is minimum, a minimum rotation radius R , as the distance defined from
 5 the pivot axis to the arm portion which is the farthest in the radial direction relative to the pivot
 6 axis, is set to exceed $1/2$ of a length B in the forward and backward directions of the interface
 7 space, the length B corresponding to a length between the front wall and the rear wall of the
 8 interface space forming portion (i.e., $B/2 < R$.”

9 102. The N2-BWS1600 product meets this limitation. The figure generally shown
 10 below confirms that the N2-BWS1600 product satisfies the claim limitation of $B/2 < R$.

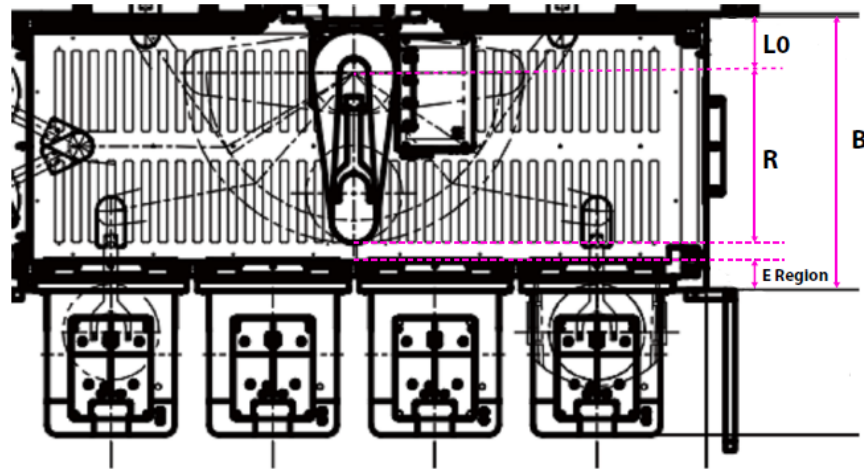


19 Ex. G annotated.

20 103. Claim 17 (which depends from claim 15) of the RE145 Patent further includes “the
 21 minimum rotation radius R is set to be equal to or less than an allowable length $(B-E)$ to be
 22 obtained by subtracting a length E of a robot invasion restricted region, which is set for the FOUP
 23 opener and is measured from the front wall in the forward and backward directions toward the
 24 rear wall, from the length B (i.e., $R \leq B-E$), and the minimum rotation radius R is set so that the
 25 robot arm in the minimum transformed state cannot enter the robot invasion restricted region.”

26 104. The length E of each of the robot invasion restricted regions is set for the FOUP
 27 opener and located in the E Region as generally shown in the figure below. The figure below
 28 confirms that the minimum rotation radius R of the N2-BWS1600 product satisfies the claim

1 limitation of $R \leq B - E$.



10 Ex. G annotated.

11 105. As generally shown in the figure above, the minimum rotational radius R of the
 12 N2-BWS1600 product is set so that the robot arm in the minimum transformed state does not
 13 enter a robot invasion restricted region that is located in the E Region.

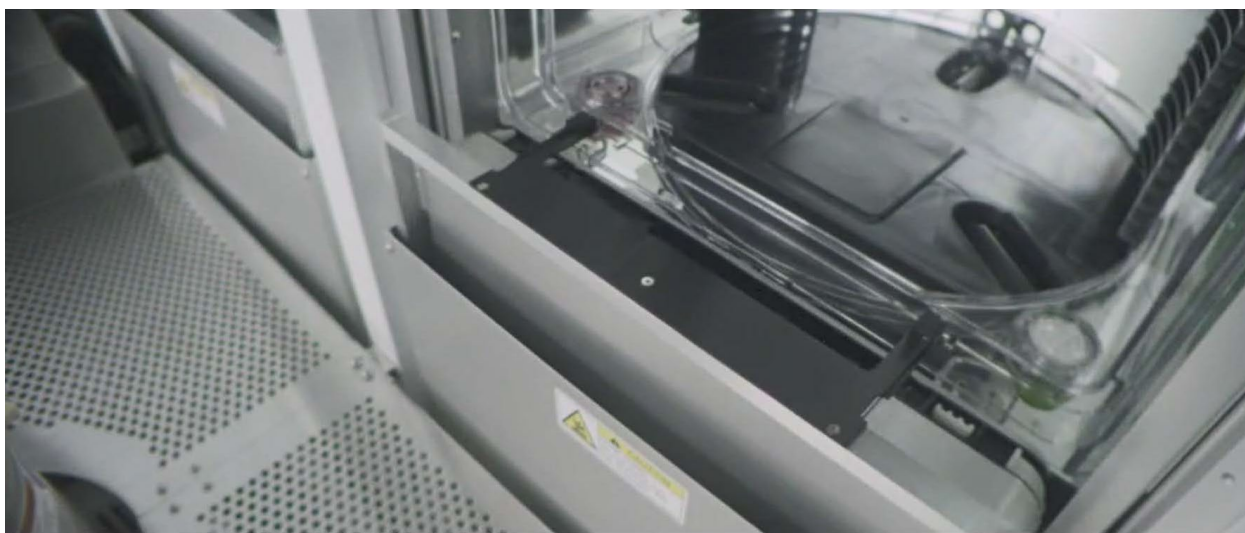
14 106. Claim 17 (which depends from claim 15) of the RE145 Patent further includes “the
 15 robot invasion restricted region is defined by a distance which the FOUP opener moves in the
 16 forward and backward directions of the interface space, wherein the FOUP opener opens and
 17 closes an opener-side door and a FOUP-side door.”

18 107. The N2-BWS1600 product meets this limitation. The FOUP opener of the N2-
 19 BWS1600 product moves in the forward and backward directions to thereby define robot invasion
 20 restricted regions, which are measurable in the forward and backward directions, as shown, for
 21 example, by the pictures below captured from the Rorze Video.

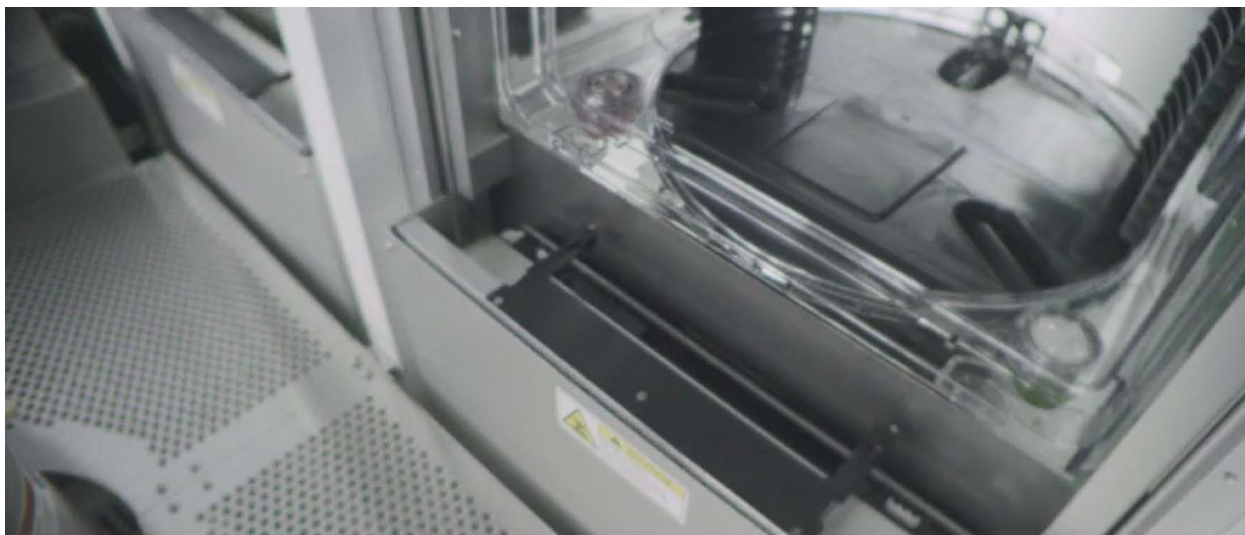
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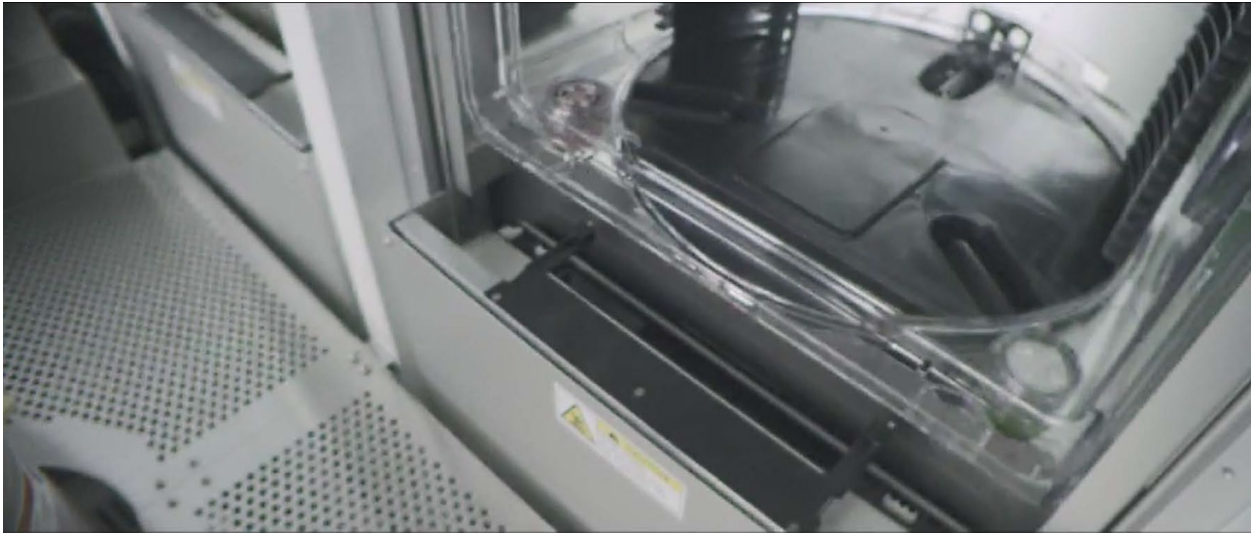
Rorze Video, around 35 secs.



Id., around 35 secs.



Id., around 37 secs.



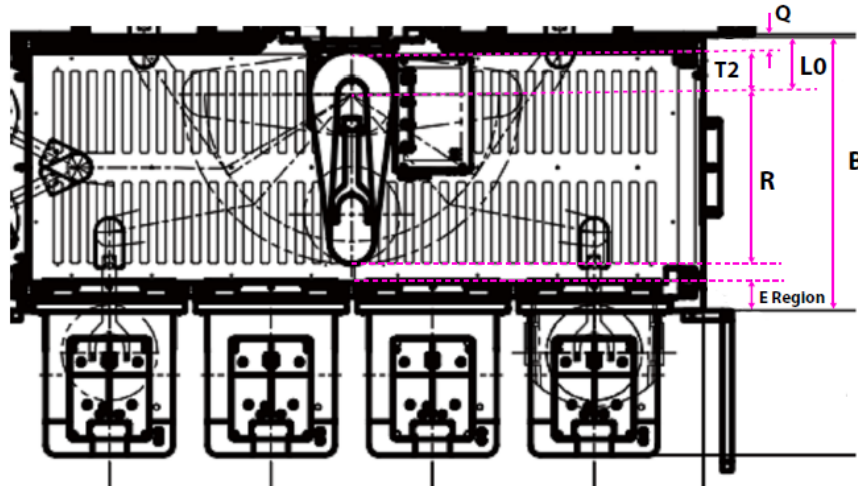
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10 *Id.*, around 37 secs.

11 108. Also, the Foup opener opens and closes the opener side door and the Foup side
12 door. *See* Rorze Video, 32-37 secs, 89-91 secs.

13 109. Lastly, claim 17 (which depends from claim 15) of the RE145 Patent further
14 includes “wherein the minimum rotation radius R is further set to be equal to or less than a second
15 allowable length $(B-E-L_0)$ to be obtained by subtracting (i) the length E of the robot invasion
16 restricted region and (ii) a distance L_0 set equal to $Q+T_2$ where Q is a predetermined gap length
17 and T_2 is a distance from the pivot axis to an outer surface of a first link member of the plurality
18 of link members that is adjacent one of the front and rear walls, from the length B (i.e., $R \leq B-E-$
19 L_0).”

20 110. This limitation is met by the N2-BWS1600 product. As generally shown below,
21 the N2-BWS1600 product satisfies $L_0=Q+T_2$. Further, the figure below confirms that the
22 minimum rotation radius R of the N2-BWS1600 product satisfies $R \leq B-E-L_0$ because as generally
23 shown below, the robot invasion restricted region E , which is located in the E Region, is not
24 greater than $B-R-L_0$ in the N2-BWS1600 product.
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Ex. G annotated.

111. The Accused Products, and Rorze’s acts of importation, offer for sale, and/or sale of the Accused Products are in competition with Plaintiff and its products.

COUNT I – PATENT INFRINGEMENT: U.S. Reissue Patent No. RE47,909

112. Plaintiff repeats and incorporates by reference the allegations set forth in Paragraphs 1–111 above.

113. Rorze has infringed and is continuing to infringe at least claim 15 of the RE909 Patent, literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling and/or supplying in or from the United States, the Accused Products, and/or by inducing and/or contributing to such conduct by Rorze’s customers or other persons or entities, without authority and in violation of 35 U.S.C. § 271(a), (b) and/or (c).

114. Rorze does not have any license or other authority from Plaintiff or any other person or entity to practice the subject matter claimed by the RE909 Patent.

115. The notice provisions of 35 U.S.C. § 287 with respect to the RE909 Patent are satisfied at least as of the date of receipt of the correspondence dated December 8, 2021 from KHI to RCO that identified the RE909 Patent. *See* Exhibit H.

116. Rorze’s infringing acts, occurring at least after receipt of the December 8, 2021 correspondence, constitute willful infringement of the RE909 Patent, rendering this an exceptional case pursuant to 35 U.S.C. § 285.

1 **COUNT II – PATENT INFRINGEMENT: U.S. Reissue Patent No. RE46,465**

2 117. Plaintiff repeats and incorporates by reference the allegations set forth in
3 Paragraphs 1–116 above.

4 118. Rorze has infringed and is continuing to infringe at least claim 15 of the RE465
5 Patent, literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling
6 and/or supplying in or from the United States, the Accused Products, and/or by inducing and/or
7 contributing to such conduct by Rorze’s customers or other persons or entities, without authority
8 and in violation of 35 U.S.C. § 271(a), (b) and/or (c).

9 119. Rorze does not have any license or other authority from Plaintiff or any other
10 person or entity to practice the subject matter claimed by the RE465 Patent.

11 120. The notice provisions of 35 U.S.C. § 287 with respect to the RE465 Patent are
12 satisfied at least as of the date of receipt of the correspondence dated December 8, 2021 from
13 KHI to RCO that identified the RE465 Patent. *See* Ex. H.

14 121. Rorze’s infringing acts, occurring at least after receipt of the December 8, 2021
15 correspondence, constitute willful infringement of the RE465 Patent, rendering this an
16 exceptional case pursuant to 35 U.S.C. § 285.

17 **COUNT III – PATENT INFRINGEMENT: U.S. Reissue Patent No. RE48,031**

18 122. Plaintiff repeats and incorporates by reference the allegations set forth in
19 Paragraphs 1–121 above.

20 123. Rorze has infringed and is continuing to infringe at least claim 29 of the RE031
21 Patent, literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling
22 and/or supplying in or from the United States, the Accused Products, and/or by inducing and/or
23 contributing to such conduct by Rorze’s customers or other persons or entities, without authority
24 and in violation of 35 U.S.C. § 271(a), (b) and/or (c).

25 124. Rorze does not have any license or other authority from Plaintiff or any other
26 person or entity to practice the subject matter claimed by the RE031 Patent.

27 125. The notice provisions of 35 U.S.C. § 287 with respect to the RE031 Patent are
28 satisfied at least as of the date of receipt of the correspondence dated December 8, 2021 from

1 KHI to RCO that identified the RE031 Patent. *See* Ex. H.

2 126. Rorze's infringing acts, occurring at least after receipt of the December 8, 2021
3 correspondence, constitute willful infringement of the RE031 Patent, rendering this an
4 exceptional case pursuant to 35 U.S.C. § 285.

5 **COUNT IV – PATENT INFRINGEMENT: U.S. Reissue Patent No. RE45,772**

6 127. Plaintiff repeats and incorporates by reference the allegations set forth in
7 Paragraphs 1–126 above.

8 128. Rorze has infringed and is continuing to infringe at least claim 1 of the RE772
9 Patent, literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling
10 and/or supplying in or from the United States, the Accused Products, and/or by inducing and/or
11 contributing to such conduct by Rorze's customers or other persons or entities, without authority
12 and in violation of 35 U.S.C. § 271(a), (b) and/or (c).

13 129. Rorze does not have any license or other authority from Plaintiffs or any other
14 person or entity to practice the subject matter claimed by the RE772 Patent.

15 130. The notice provisions of 35 U.S.C. § 287 with respect to the RE772 Patent are
16 satisfied as early as receipt of the correspondence dated June 14, 2017 from KHI to RCO that
17 identified the RE772 Patent. *See* Exhibit I.

18 131. Rorze's infringing acts, occurring as early as receipt of the June 14, 2017
19 correspondence, constitute willful infringement of the RE772 Patent, rendering this an
20 exceptional case pursuant to 35 U.S.C. § 285.

21 **COUNT V – PATENT INFRINGEMENT: U.S. Reissue Patent No. RE47,145**

22 132. Plaintiff repeats and incorporates by reference the allegations set forth in
23 Paragraphs 1–131 above.

24 133. Rorze has infringed and is continuing to infringe at least claim 17 of the RE145
25 Patent, literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling
26 and/or supplying in or from the United States, the Accused Products, and/or by inducing and/or
27 contributing to such conduct by Rorze's customers or other persons or entities, without authority
28 and in violation of 35 U.S.C. § 271(a), (b) and/or (c).

1 134. Rorze does not have any license or other authority from Plaintiffs or any other
2 person or entity to practice the subject matter claimed by the RE145 Patent.

3 135. The notice provisions of 35 U.S.C. § 287 with respect to the RE145 Patent are
4 satisfied at least as of the date of receipt of the correspondence dated December 8, 2021 from
5 KHI to RCO that identified the RE145 Patent. *See* Ex. H.

6 136. Rorze's infringing acts, occurring at least after receipt of the December 8, 2021
7 correspondence, constitute willful infringement of the RE145 Patent, rendering this an
8 exceptional case pursuant to 35 U.S.C. § 285.

9 **PRAYER FOR RELIEF**

10 WHEREFORE, Plaintiff respectfully requests for judgment:

- 11 1. adjudging that Defendant Rorze has infringed and is continuing to infringe the
12 RE909 Patent;
- 13 2. adjudging that Defendant Rorze has infringed and is continuing to infringe the
14 RE465 Patent;
- 15 3. adjudging that Defendant Rorze has infringed and is continuing to infringe the
16 RE031 Patent;
- 17 4. adjudging that Defendant Rorze has infringed and is continuing to infringe the
18 RE772 Patent;
- 19 5. adjudging that Defendant Rorze has infringed and is continuing to infringe the
20 RE145 Patent;
- 21 6. awarding Plaintiff damages adequate to compensate for Rorze's infringement of
22 the RE909, RE465, RE031, RE772 and RE145 Patents together with interest and
23 costs as fixed by the Court, which damages include lost profits, and in no event
24 less than a reasonable royalty;
- 25 7. enjoining Rorze or any of its agents or related entities from making, using, offering
26 to sell, selling, and/or supplying in or from the United States the Accused Products
27 and any other systems and components of systems or methods that practice, or
28 otherwise aiding or inducing Rorze's customers or other persons or entities to

- 1 practice, the subject matter of the RE909, RE465, RE031, RE772 and RE145
2 Patents, pursuant to 35 U.S.C. § 283;
- 3 8. adjudging that Rorze’s continued infringement of the RE909, RE465, RE031,
4 RE772 and RE145 Patents is willful and increasing up to treble all damages
5 awarded to Plaintiff for such infringement, pursuant to 35 U.S.C. § 284;
- 6 9. declaring this exception case under 35 U.S.C. § 285 and awarding Plaintiff its
7 attorneys’ fees, costs, and expenses; and
- 8 10. granting Plaintiff such other and further relief as this Court deems just and proper.

9 **JURY DEMAND**

10 Pursuant to Federal Rules of Civil Procedure 38 and 39, Plaintiff asserts its rights under
11 the Seventh Amendment to the United States Constitution and demand a trial by jury on all issues
12 triable as such.

13 Dated: August 30, 2022

CROWELL & MORING LLP

14
15 By: /s/ Thomas F. Koegel

16 Thomas F. Koegel
17 Molly A. Jones
18 James R. Sobieraj*
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(* *pro hac vice* applications forthcoming)

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