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(54) **SUBSTRATE TREATING APPARATUS AND SUBSTRATE TRANSPORTING METHOD**

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(57) **ABSTRACT**

A substrate transport mechanism receives two substrates from an upstream ID section using two arms of three arms. The substrate transport mechanism delivers one of the two substrates to and from an individual processing unit of a processing block using one of arms holding the one of the two substrates to be subjected to a given process by the processing block and one of the arms holding no substrate. The substrate transport mechanism then keeps holding the other substrate with the remaining one arm of the arms having received the substrates while the processing unit processes the substrate. The substrate transport mechanism transfers the two substrates to a downstream processing block using the one arm holding the substrate subjected to the given process by the processing block and the one arm holding the other substrate.

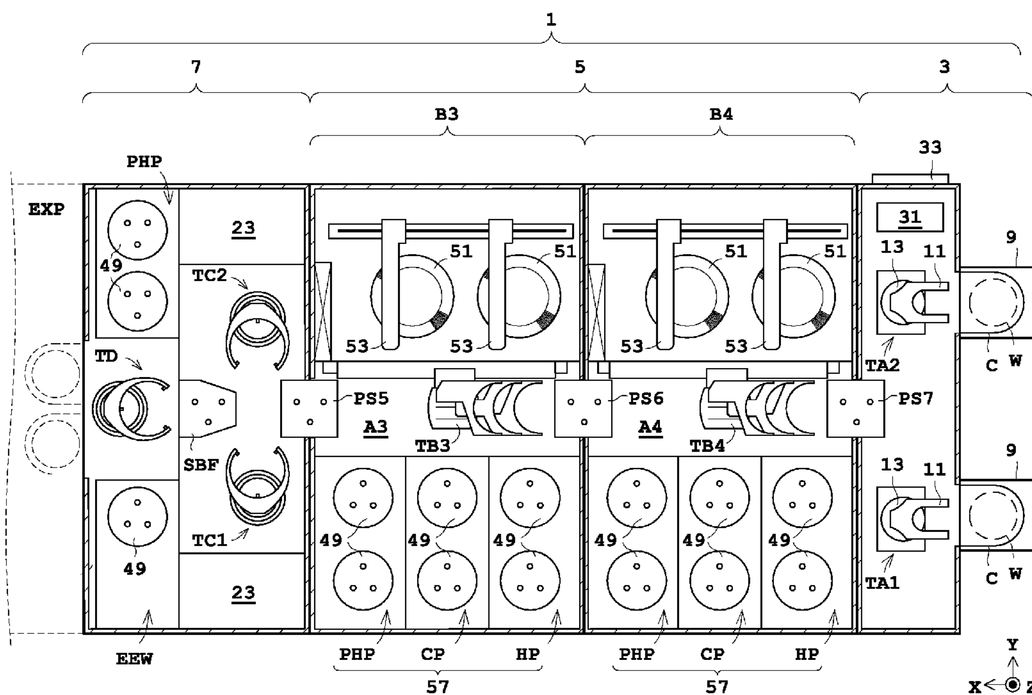


Fig.1 (CONVENTIONAL ART)

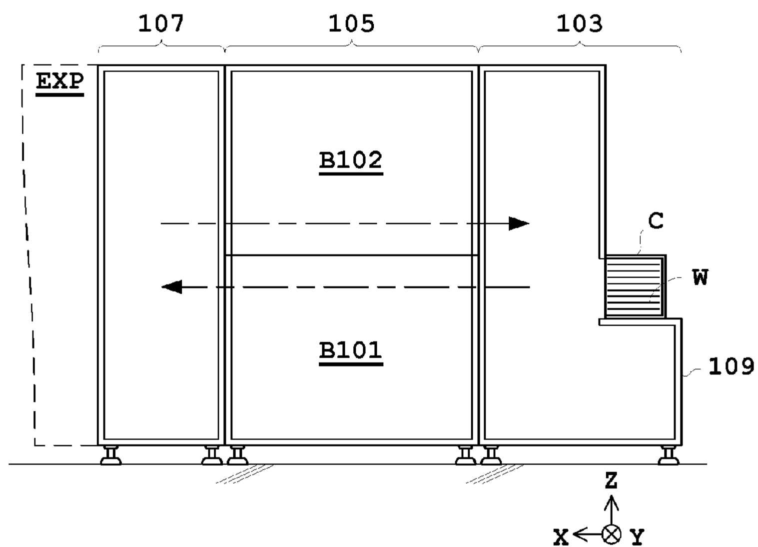


Fig.2 (CONVENTIONAL ART)

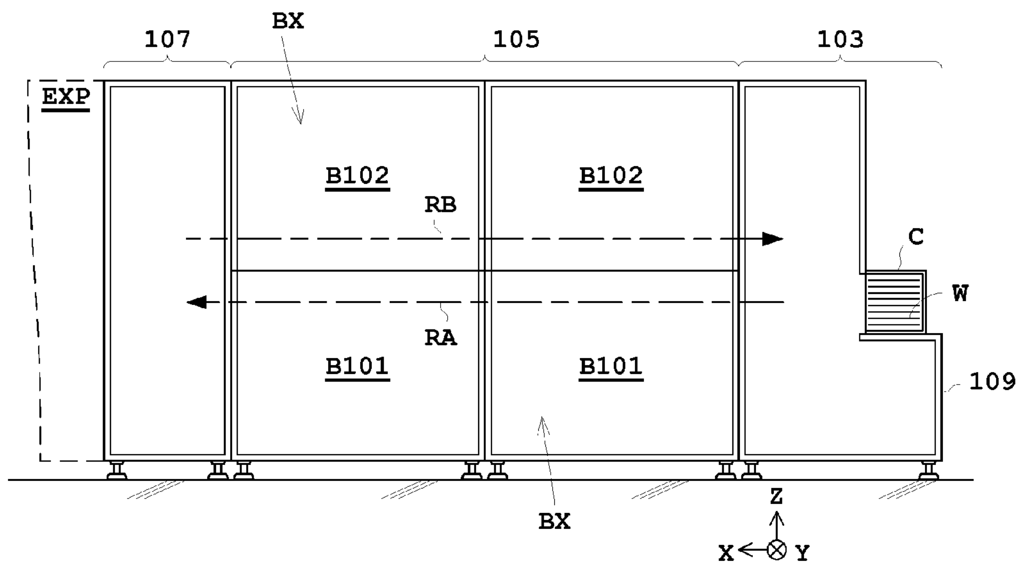


Fig.3

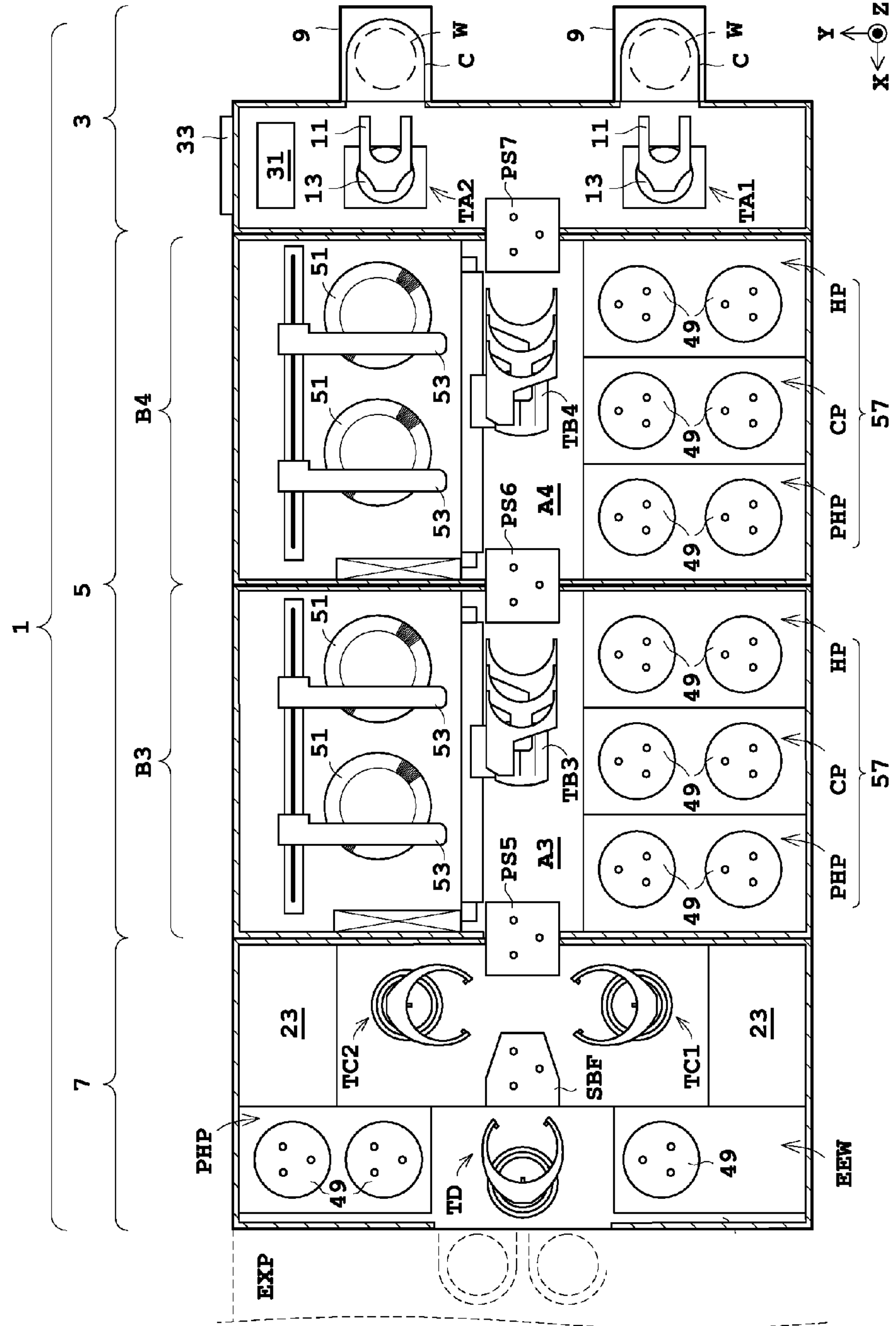


Fig.4

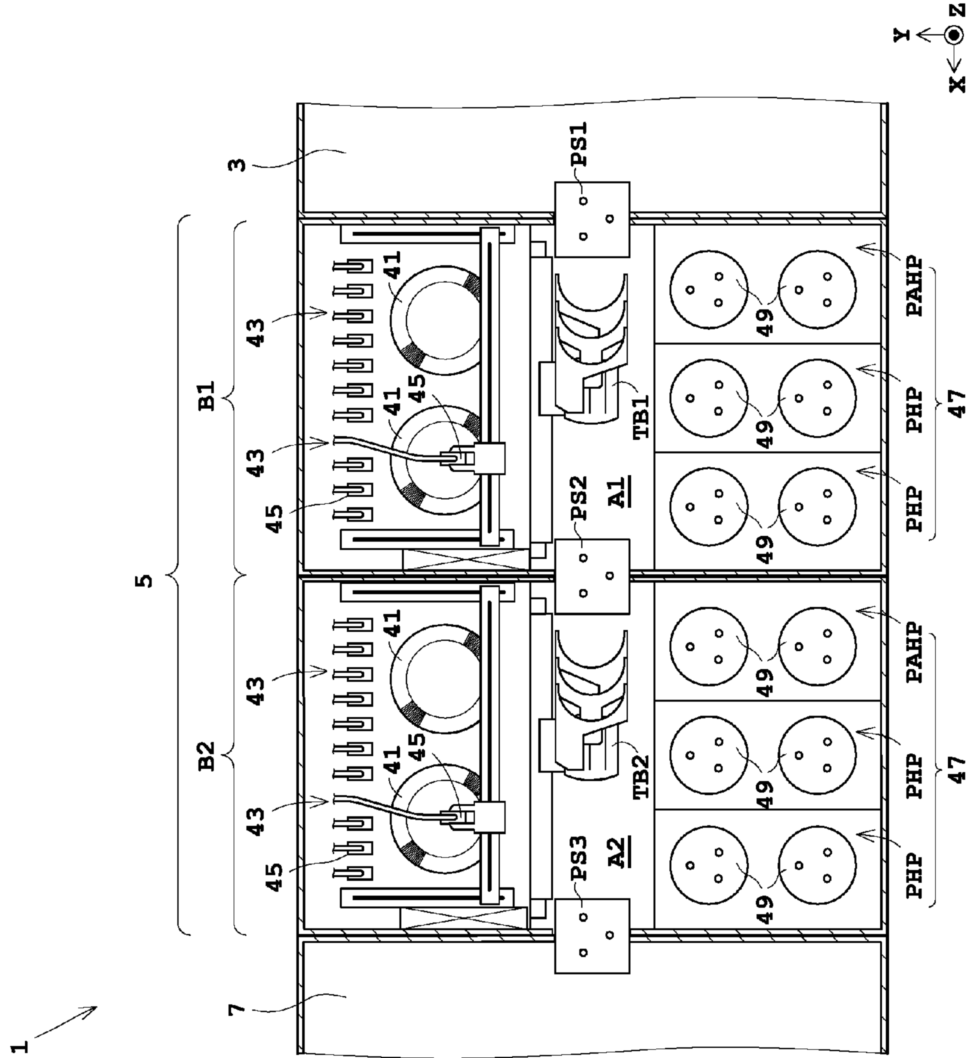


Fig.5

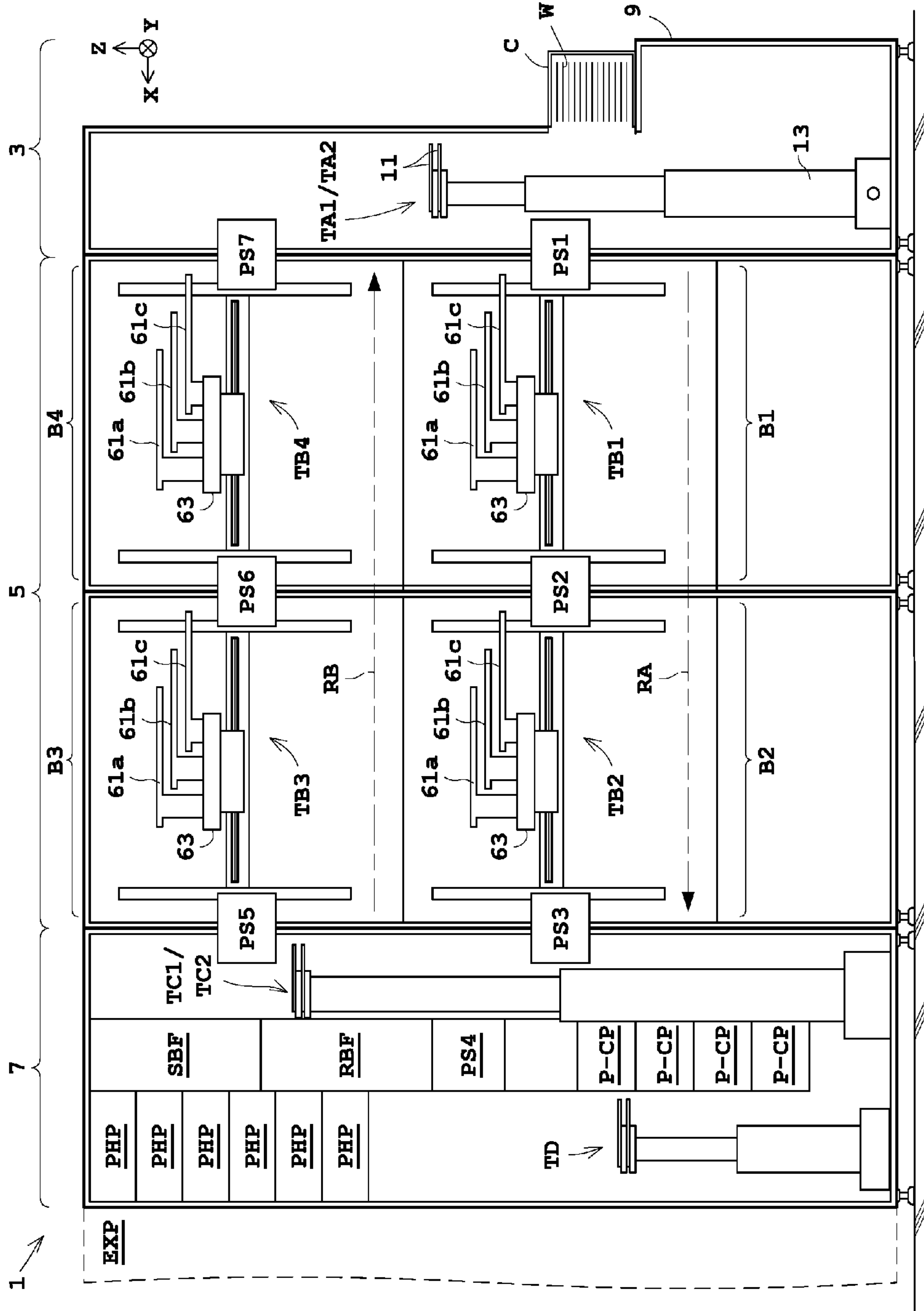
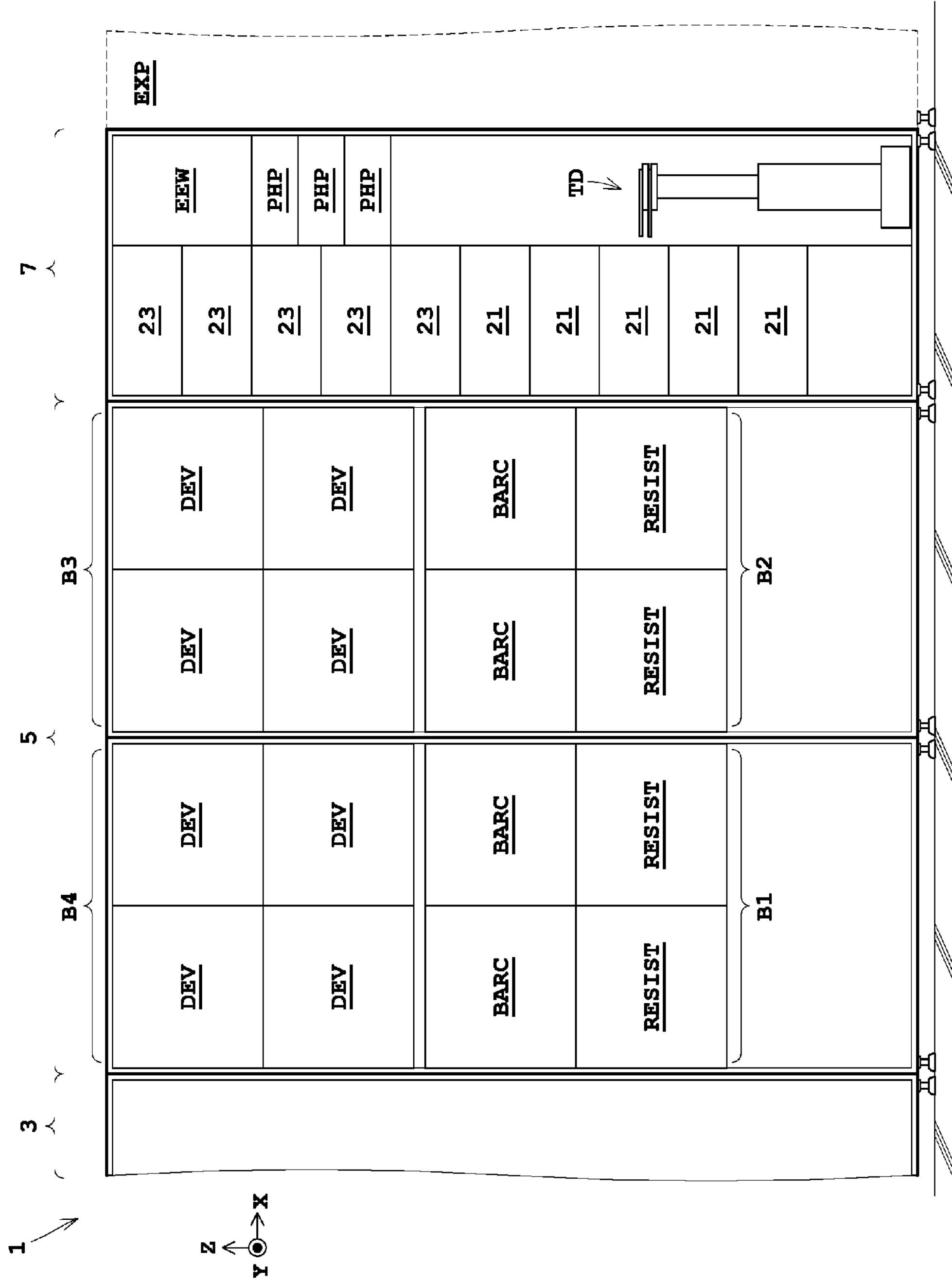


Fig.6



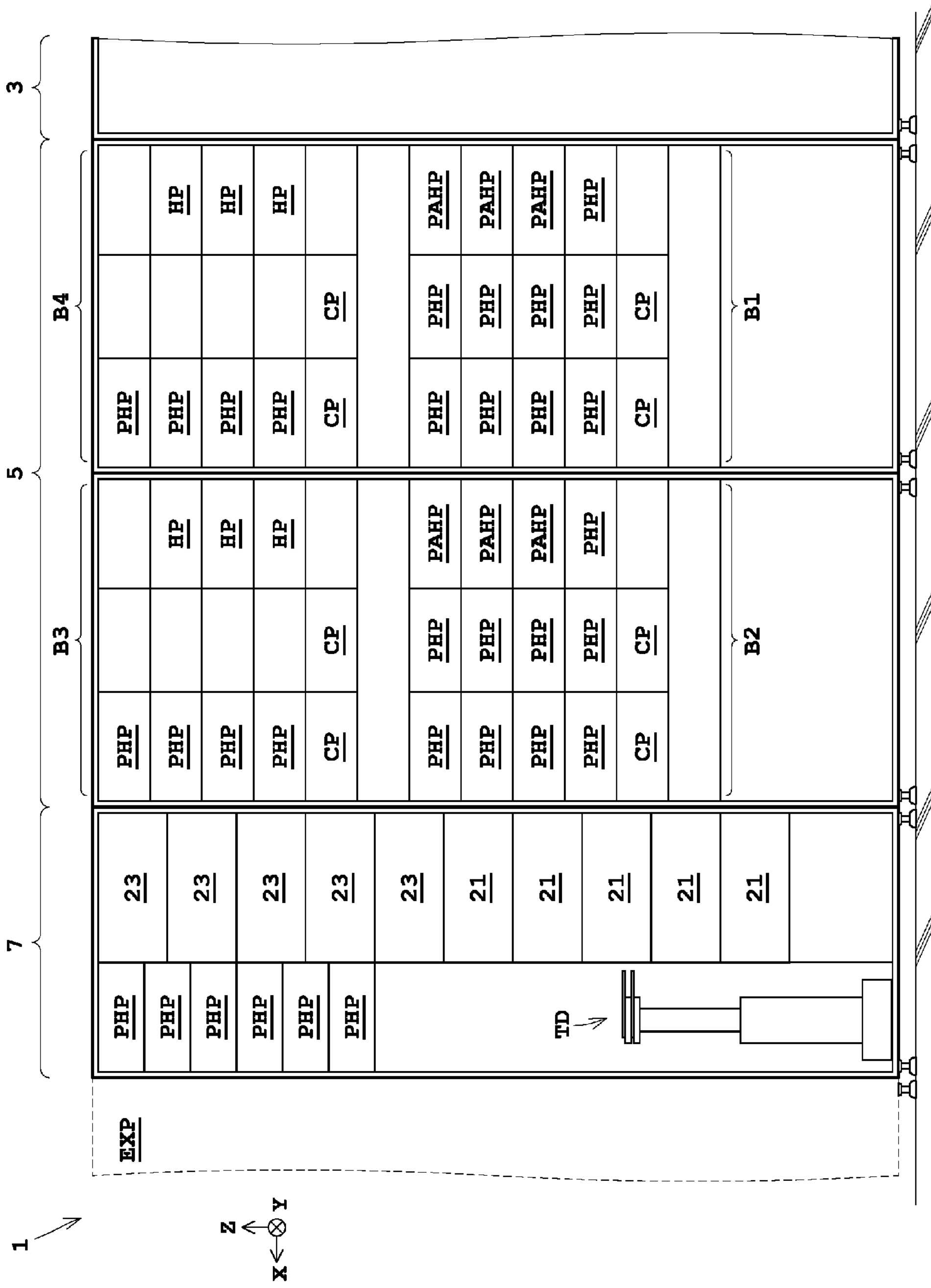


Fig.7
3
5
7
B4
B3
B1
B2
HP
PAHP
PHP
CP
23
21
TD
EXP
1
Z
Y
X

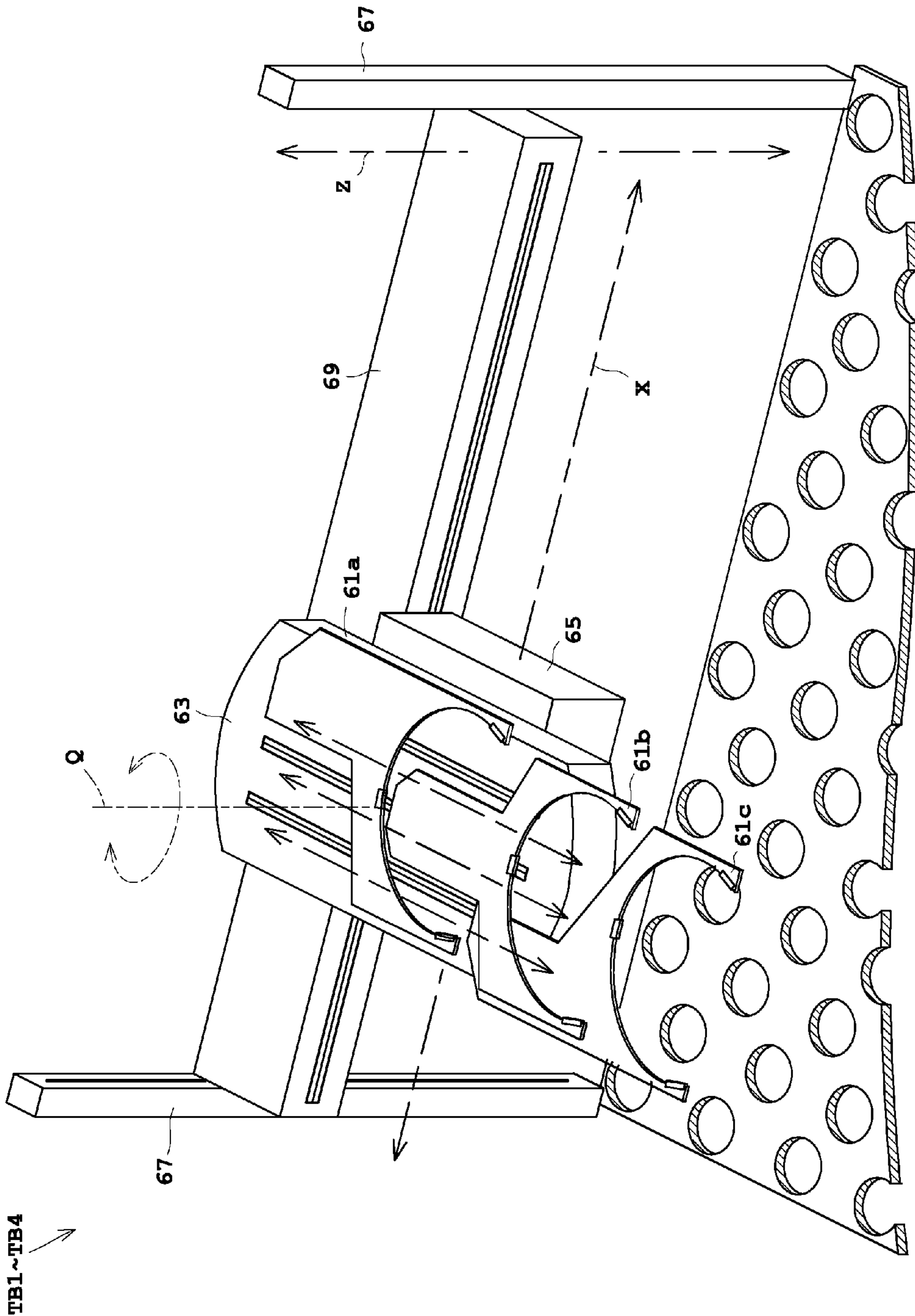


Fig.8
TB1~TB4
67
67
69
65
63
61a
61b
61c
Q
X
Z

Fig.9A

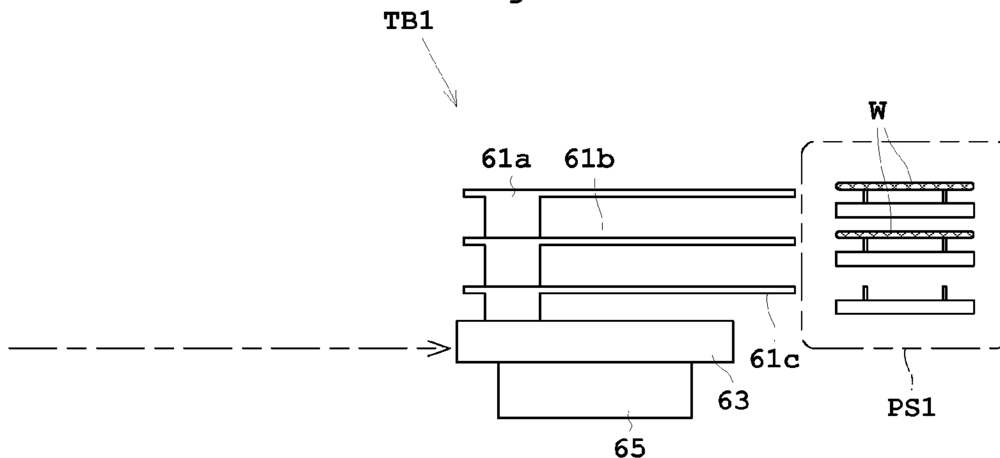


Fig.9B

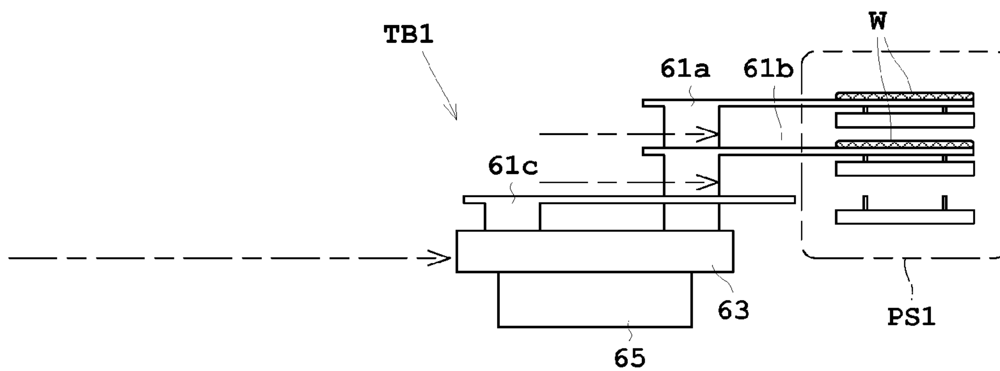


Fig.9C

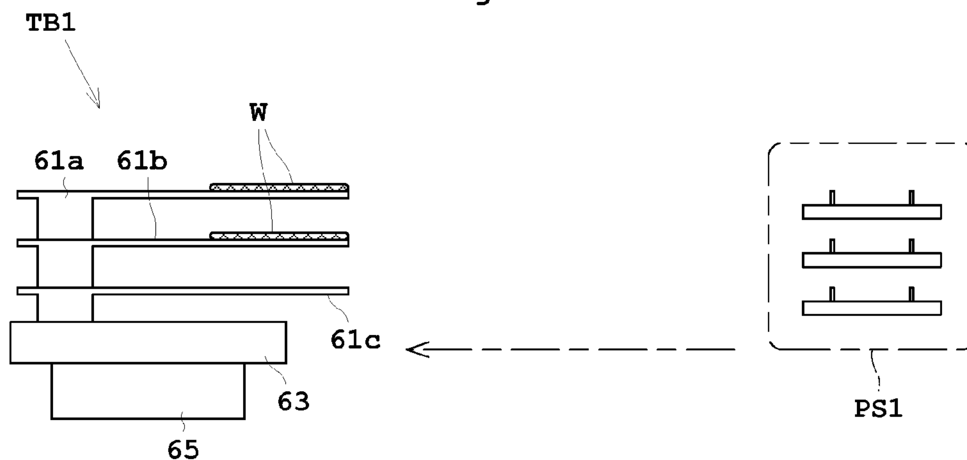


Fig.10A

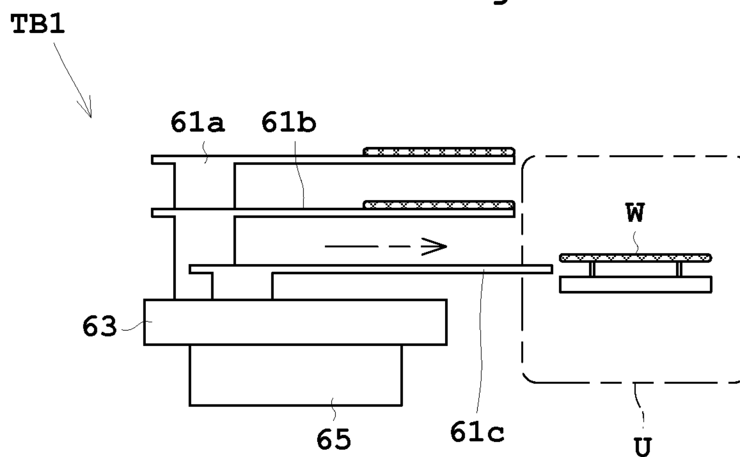


Fig.10B

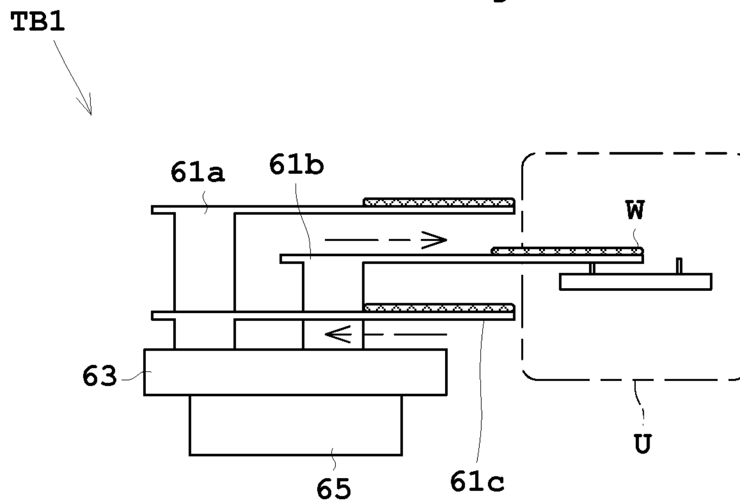


Fig.11A

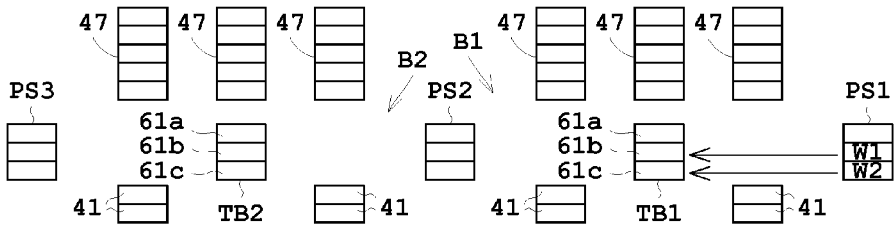


Fig.11B

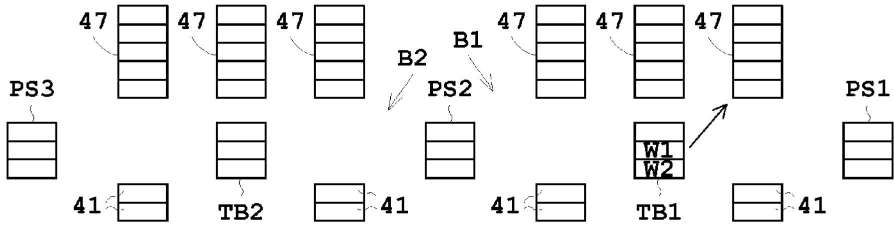


Fig.11C

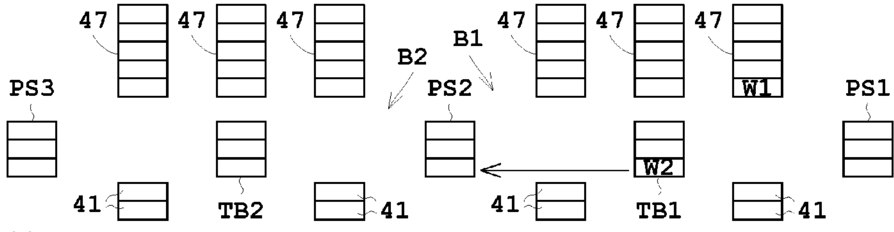


Fig.11D

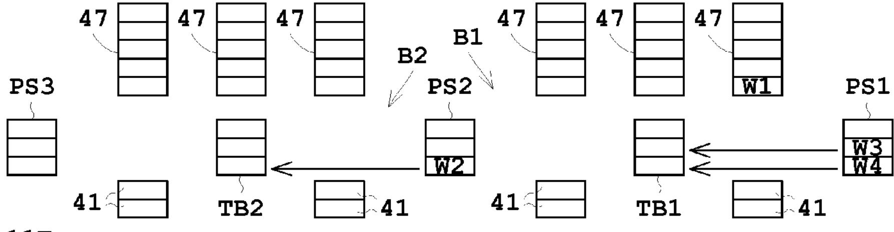


Fig.11E

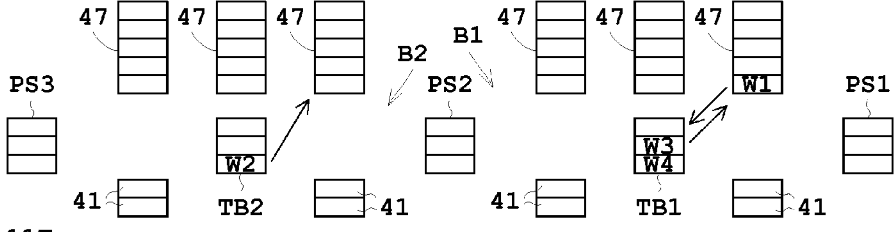


Fig.11F

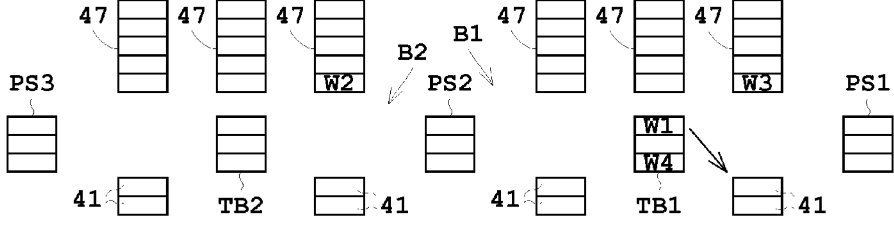


Fig.12A

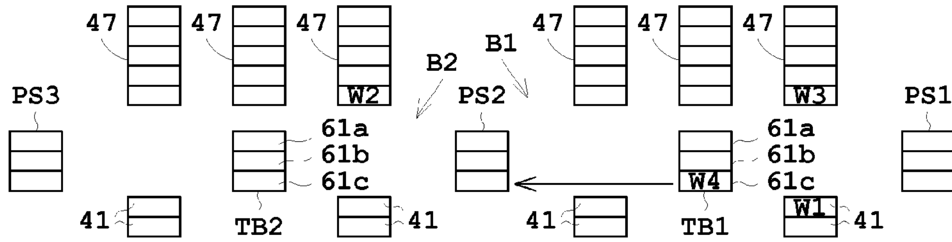


Fig.12B

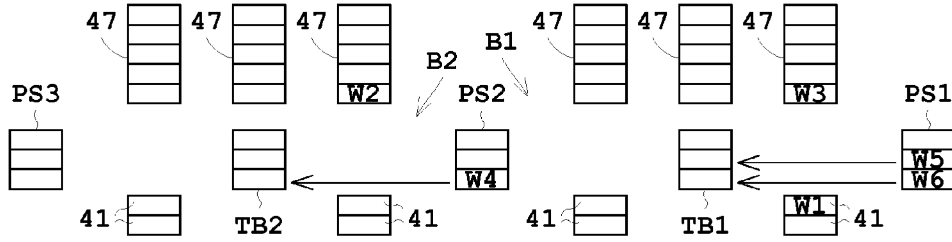


Fig.12C

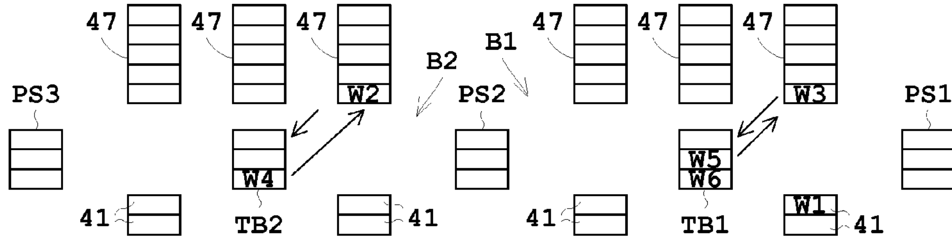


Fig.12D

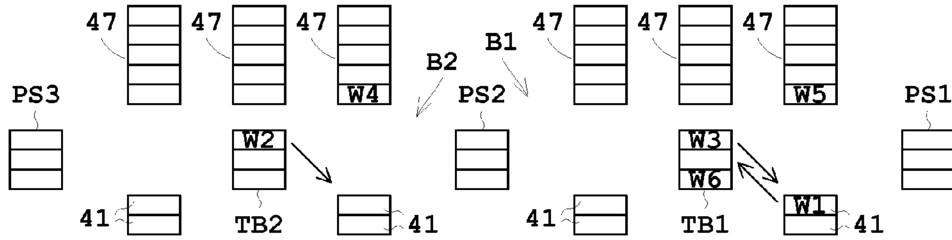


Fig.12E

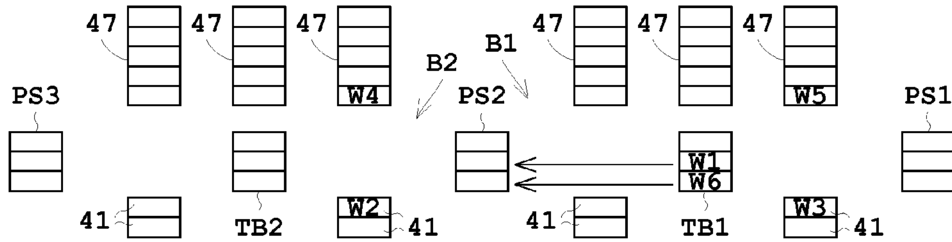


Fig.12F

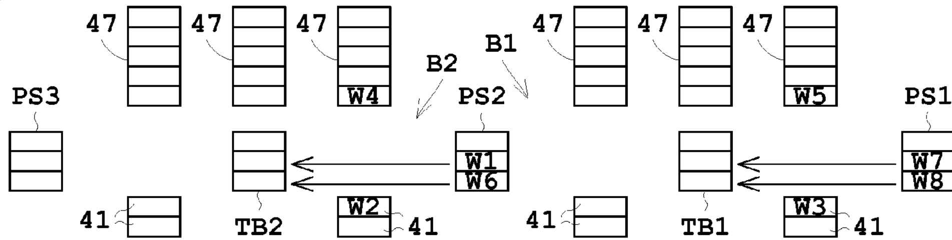


Fig.13A

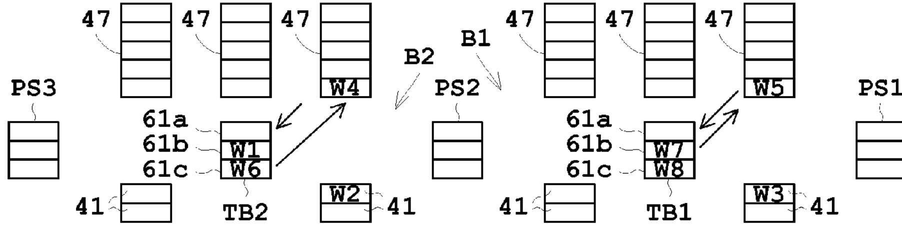


Fig.13B

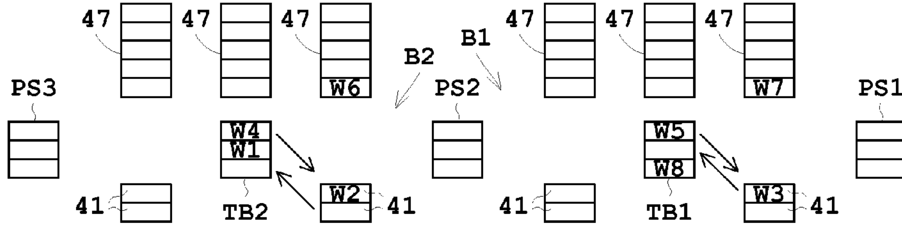


Fig.13C

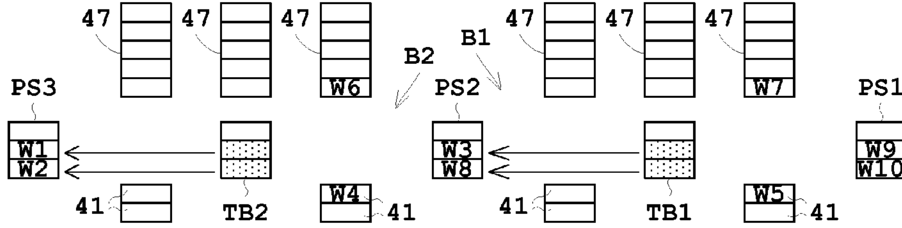


Fig.13D

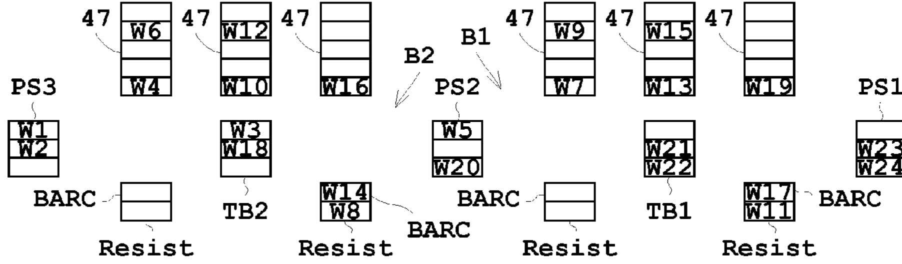
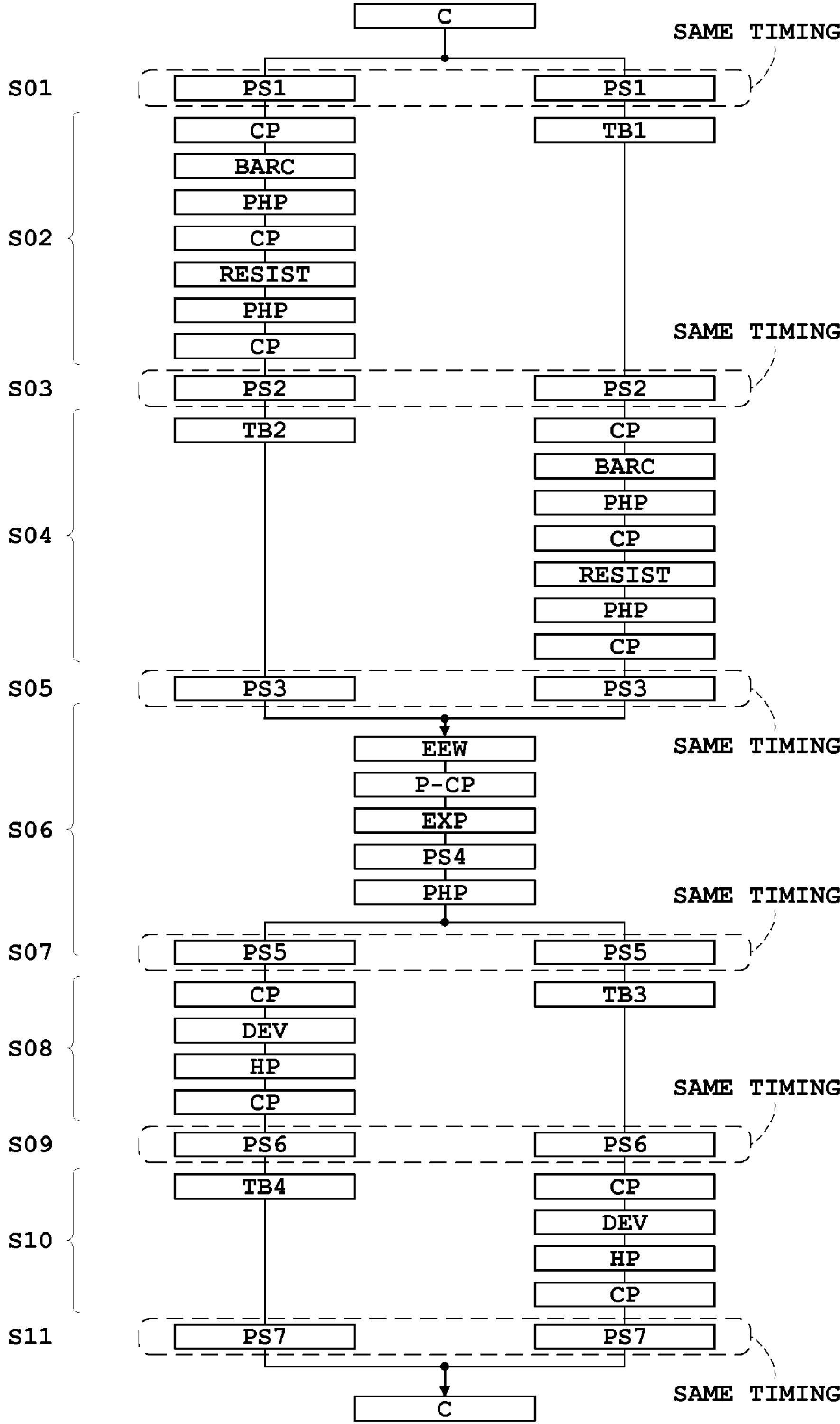


Fig.14



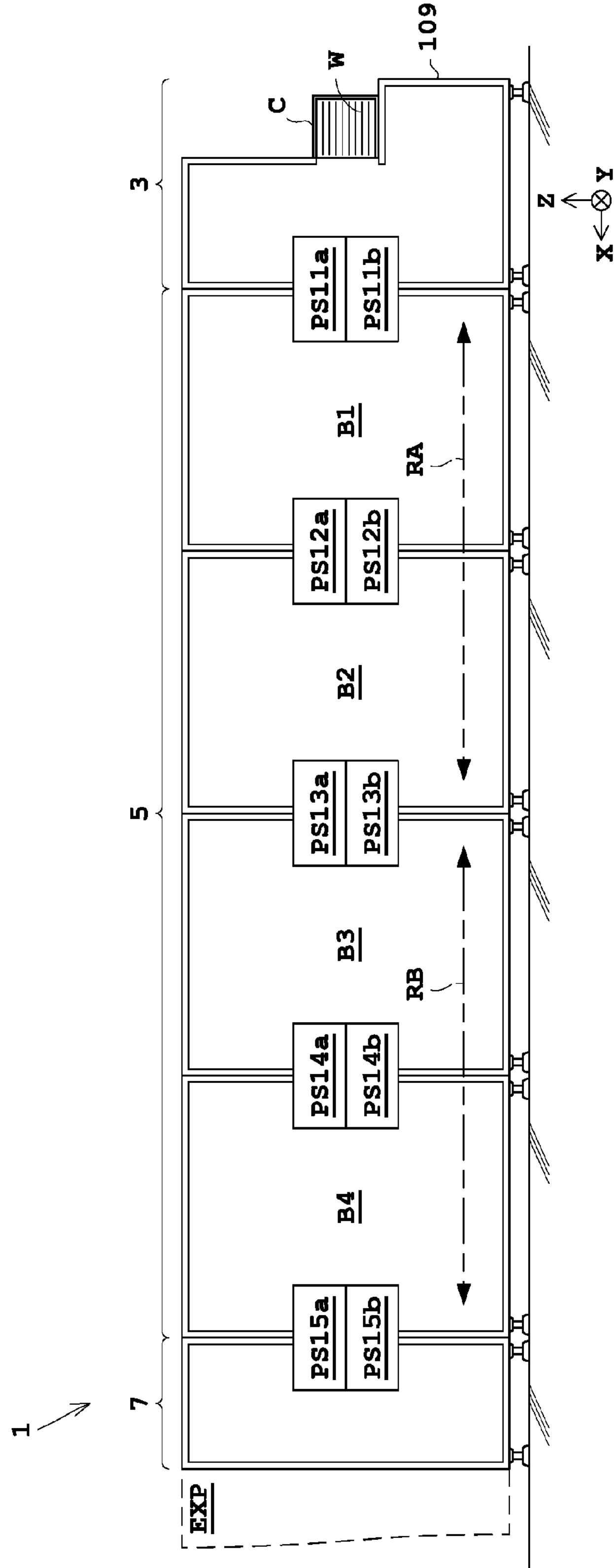


Fig.15
1
3
5
7
C
W
109
Z
Y
X
PS11a
PS11b
B1
RA
PS12a
PS12b
B2
PS13a
PS13b
B3
RB
PS14a
PS14b
B4
PS15a
PS15b
EXP

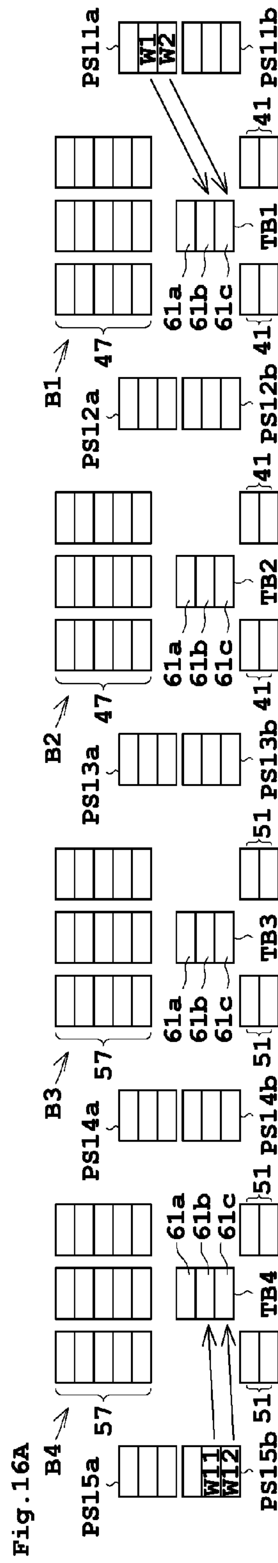


Fig.16A
B4
57
PS15a
PS15b
W11
W12
51
TB4
61a
61b
61c
B3
PS14a
PS14b
TB3
B2
PS13a
PS13b
47
41
TB2
B1
PS12a
PS12b
TB1
PS11a
PS11b
W1
W2

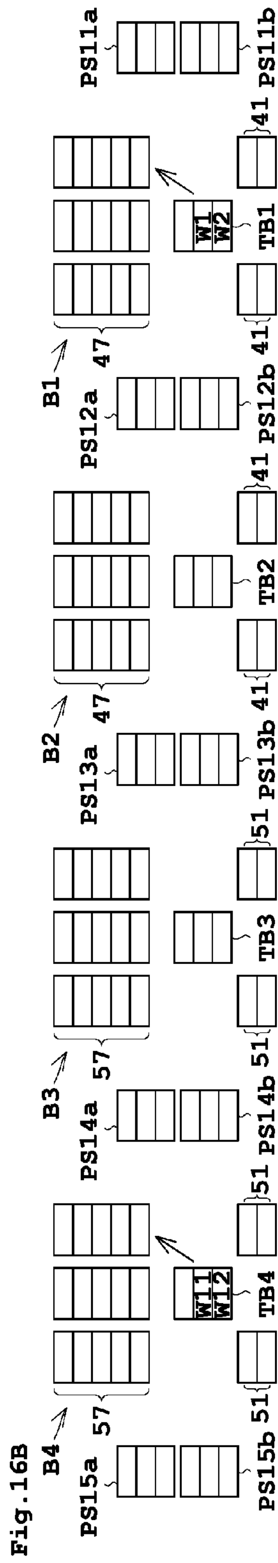


Fig.16B
B4
57
PS15a
PS15b
51
TB4
W11
W12
B3
PS14a
PS14b
TB3
B2
PS13a
PS13b
47
41
TB2
B1
PS12a
PS12b
TB1
W1
W2
PS11a
PS11b

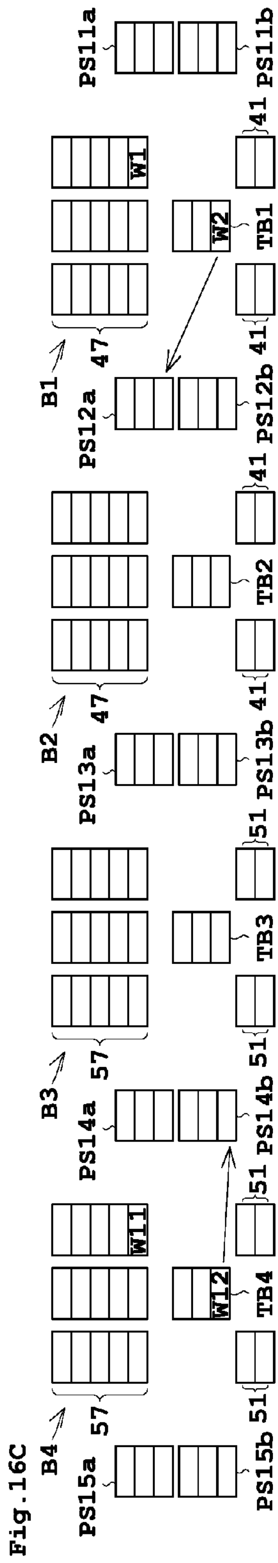


Fig.16C
B4
57
PS15a
PS15b
51
TB4
W12
W11
B3
PS14a
PS14b
TB3
B2
PS13a
PS13b
47
41
TB2
B1
PS12a
PS12b
TB1
W2
W1
PS11a
PS11b

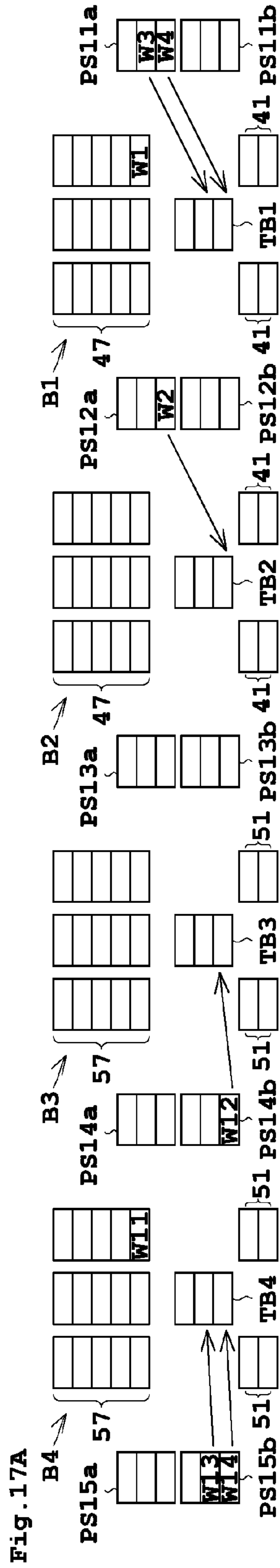


Fig.17A
B4
57
PS15a
PS15b
51
W13
W14
TB4
W11
B3
57
PS14a
PS14b
W12
TB3
B2
47
PS13a
PS13b
41
TB2
PS12a
PS12b
W2
B1
47
TB1
W1
PS11a
PS11b
W3
W4

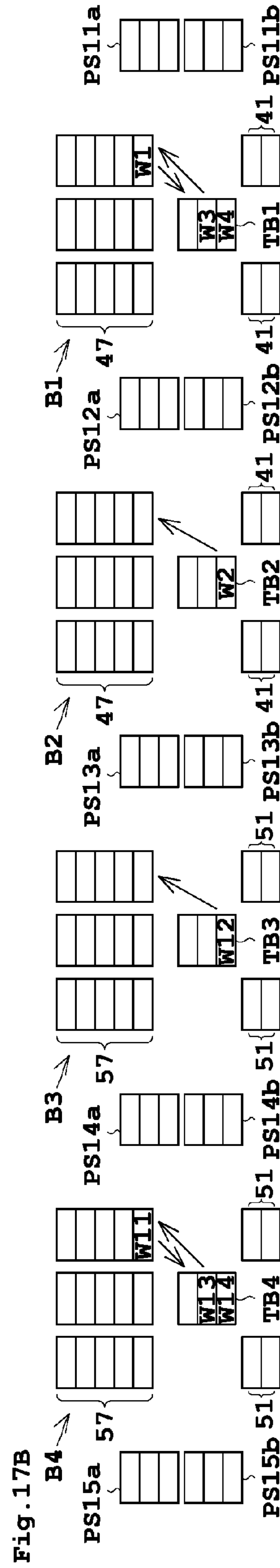


Fig.17B
B4
57
PS15a
PS15b
51
W13
W14
TB4
W11
B3
57
PS14a
PS14b
W12
TB3
B2
47
PS13a
PS13b
41
W2
TB2
PS12a
PS12b
B1
47
W3
W4
TB1
W1
PS11a
PS11b

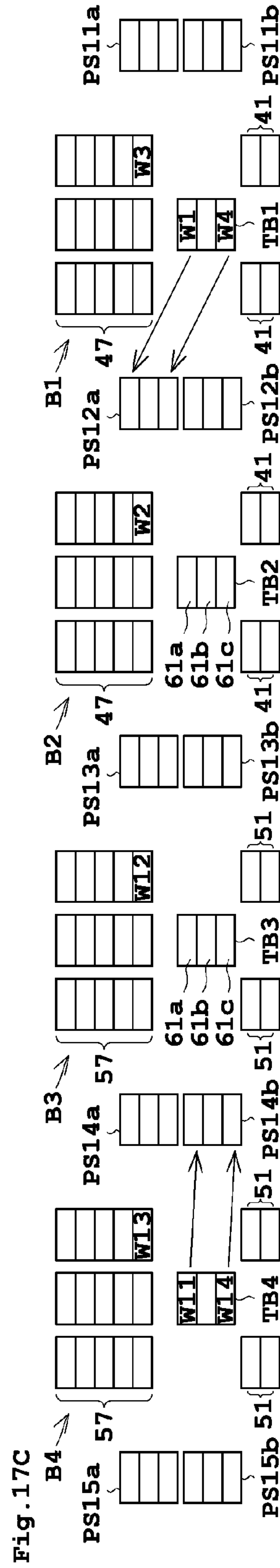


Fig.17C
B4
57
PS15a
PS15b
51
W11
W14
TB4
W13
B3
57
PS14a
PS14b
61a
61b
61c
TB3
W12
B2
47
PS13a
PS13b
41
61a
61b
61c
TB2
W2
PS12a
PS12b
B1
47
W1
W4
TB1
W3
PS11a
PS11b

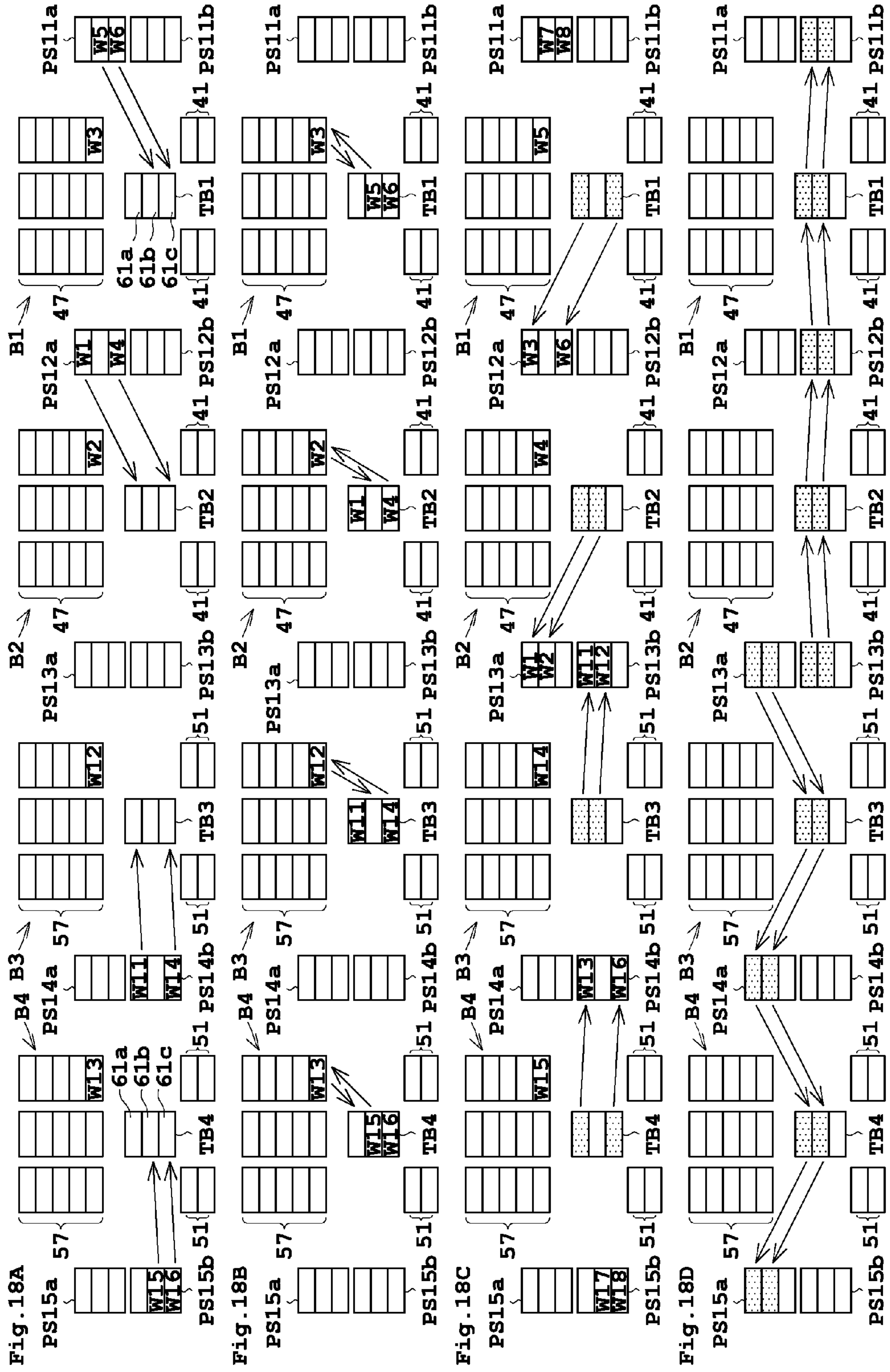


Fig.18A
Fig.18B
Fig.18C
Fig.18D
PS11a
PS11b
PS12a
PS12b
PS13a
PS13b
PS14a
PS14b
PS15a
PS15b
TB1
TB2
TB3
TB4
B1
B2
B3
B4
41
47
51
57
61a
61b
61c
W1
W2
W3
W4
W5
W6
W7
W8
W11
W12
W13
W14
W15
W16
W17
W18

SUBSTRATE TREATING APPARATUS AND SUBSTRATE TRANSPORTING METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Japanese Patent Application No. 2014-073073 filed Mar. 31, 2014 the subject matter of which is incorporated herein by reference in entirety.

TECHNICAL FIELD

[0002] The present invention relates to a substrate treating apparatus and a substrate transporting method for the substrate treating apparatus performing a series of processes to a semiconductor substrate, a glass substrate for liquid crystal display, a photo-mask glass substrate, an optical disk substrate, and the like (hereinafter, simply referred to as a "substrate").

BACKGROUND ART

[0003] FIG. **1** illustrates a currently-used substrate treating apparatus provided with an indexer **103**, a processor **105**, and an interface **107**. Moreover, the processor **105** includes an application processing block B**101** and a developing processing block B**102**. The application processing block B**101** forms a coating film, such as a resist film, on a substrate W. The developing processing block B**102** develops the substrate W. The processing blocks B**101** and B**102** each include a single substrate transport mechanism with arms for holding the substrate W, and various types of processing units. See, for example, Japanese Patent No. 3337677, Japanese Patent Publications No. 2012-033863A and 2006-216614A.

[0004] The indexer **103** feeds out the substrate W to be processed in the processing blocks B**101** and B**102**. The indexer **103** includes a mount table **109**, and an indexer transport mechanism (not shown). The mount table **109** holds a carrier C accommodating a plurality of substrates W. The indexer transport mechanism ejects the substrate W from the carrier C and places the substrate W into the carrier C. The processing blocks B**101** and B**102** each can perform either transfer or receipt of the substrate W to or from an external apparatus EXP, such as an exposure apparatus, via the interface **107**.

[0005] The processor **105** of the substrate treating apparatus illustrated in FIG. **1** has a laminated structure whose lower layer corresponds to the application processing block B**101** and whose upper layer corresponds to the developing processing block B**102**. The substrate W from the carrier C of the indexer **103** is fed out through the application processing block B**101** and the interface **107**, in this order, to the exposure apparatus EXP as the external apparatus. The exposure apparatus EXP performs exposure processing to the substrate W. The substrate W subjected to the exposure processing is fed back through the interface **107** and the developing processing block B**102**, in this order, to the indexer **103** by which the substrate W is placed into the carrier C. That is, the substrate W is transported in the processing blocks B**101** and B**102** each in one direction so as to circulate within the substrate treating apparatus.

SUMMARY OF INVENTION

Technical Problem

[0006] However, the example of the currently-used apparatus with such a construction has the following drawbacks. That is, the substrate treating apparatus obtains an enhanced substrate throughput by an approach of laminating other processing blocks vertically in addition to the two processing blocks B**101** and B**102** to perform further parallel processing. However, such an approach possesses a restriction in height. Then, another approach has been suggested in Japanese Patent Publication No. 2006-216614A and FIG. **2** in which other processing blocks B**101** and B**102** are arranged along transportation paths RA and RB, respectively. However, such an approach causes a drawback that parallel processing among a plurality of processing blocks performing the same processing (e.g., application processing) has a degraded processing efficiency.

[0007] Specifically, in the upstream processing block (see numeral BX) in FIG. **2**, the substrate transport mechanism receives the substrate W from the mount table, and replaces the substrate W between various processing units using original two arms. However, the substrate transport mechanism also has to transport a substrate W to the downstream processing block for parallel processing in addition to the replacement of the substrate W. In the downstream processing block, the substrate transport mechanism also has to transport the substrate W subjected to a given process in the upstream processing block for parallel processing in addition to the replacement of the substrate W to the various processing units. Accordingly, the upstream and downstream processing blocks each have the increased number of transporting steps. When the upstream and downstream processing blocks each have different numbers of transporting steps, the processing blocks each have various periods of time for processing. This results in a longer period of time for the processing depending on the number of substrate transportation steps to the other processing blocks for the parallel processing.

[0008] The present invention has been made regarding the state of the art noted above, and its one object is to provide a substrate treating apparatus and a substrate transporting method that allow suppressed reduction in processing efficiency of parallel processing among a plurality of processing blocks when the processing blocks for performing the same processing are arranged along the same transportation path.

Solution to Problem

[0009] The present invention is constituted as stated below to achieve the above object. One embodiment of the present invention discloses a substrate treating apparatus for treating substrates. The substrate treating apparatus includes n processing blocks arranged along an identical transportation path and performing an identical process to the substrates, the n being a natural number of 2 or larger. An individual processing block of the n processing blocks includes at least one processing unit performing a process set in advance to the substrates, and a single substrate transport mechanism having n+1 arms holding the substrates. The substrate transport mechanism receives n substrates of the substrates from an upstream processing block using n arms of the n+1 arms. The substrate transport mechanism delivers one substrate of the n substrates to and from the processing unit in the processing block using one arm of the n arms holding the one substrate of the n substrates to be subjected to a given process by the processing block and one arm of the n arms holding no substrate. The substrate transport mechanism keeps holding n−1 substrate or substrates of the n substrates using remaining n−1 arm or arms of the n arms with which the n substrates are received while the processing unit processes the one sub-

strate. The substrate transport mechanism transfers the n substrates to a downstream block using the one arm of the n arms holding the one substrate subjected to the given process by the processing block and the n−1 arm or arms holding the n−1 substrate or substrates.

[0010] The substrate transport mechanism of the substrate treating apparatus according to the embodiment of the present invention includes the n+1 arms corresponding to the n processing blocks. The substrate transport mechanism receives n substrates of the substrates from the upstream processing block of the n processing blocks with the n arms of the n+1 arms. The substrate transport mechanism delivers the n substrates to and from the processing unit in the processing block using one arm of the n arms holding the one substrate of the n substrates to be subjected to a given process by the processing block and one arm holding no substrate. The substrate transport mechanism keeps holding n−1 substrate or substrates of the n substrates using remaining n−1 arm or arms of the n arms with which the n substrates are received while the processing unit processes the one substrate. The substrate transport mechanism transfers the n substrates to a downstream processing block of the processing blocks using the one arm holding the one substrate subjected to the given process by the processing block and the n−1 arm or arms holding the n−1 substrate or substrates.

[0011] Specifically, the substrate transport mechanism delivers the substrate to and from the processing unit (i.e., replaces the substrate) in one of the processing blocks as usual while holding the substrate to be passed through the processing block using the n−1 arms for performing processing in the processing block. Likewise, the substrate transport mechanism transports the substrate to an adjacent processing block to perform the same processing. This results in a reduced number of transportation steps. In addition, the processing blocks have approximately the same number of substrate transportation steps to the processing units. This achieves substantially the same time for processing in the processing blocks. Accordingly, suppressing reduction in processing efficiency of parallel processing among the processing blocks is obtainable.

[0012] Moreover, it is preferable that the substrate transport mechanism of the substrate treating apparatus further includes an arm holding table holding the arms so as for the arms to be movable horizontally and to be movable along the transportation path, and the substrate transport mechanism receives the n substrates from the upstream processing block when the arm holding table is located adjacent to the upstream processing block on the transportation path. Moreover, it is preferable that the substrate transport mechanism further includes an arm holding table holding the arms so as for the arms to be movable horizontally and to be movable along the transportation path, and the substrate transport mechanism transfers the n substrates to the downstream processing block when the arm holding table is located adjacent to the downstream processing block on the transportation path.

[0013] This achieves suppression of reduction in processing efficiency of the parallel processing among the processing blocks when the substrate transport mechanism receives the n substrates from the upstream processing block or transfers the n substrates to the downstream processing block while the arm holding table holding the arms moves.

[0014] Moreover, it is preferable that the substrate transport mechanism of the substrate treating apparatus receives the n substrates simultaneously from the upstream processing block. Moreover, it is preferable that the substrate transport mechanism of the substrate treating apparatus transfers the n substrates simultaneously to the downstream processing block. This achieves a shortened substrate transportation time, resulting in enhanced throughput of the substrate treating apparatus.

[0015] Moreover, it is preferable that the substrate treating apparatus further includes a mount table between the adjacent upstream and downstream processing blocks for placing the substrate so as to perform either transfer or receipt of the substrate to or from the processing block. This allows either transfer or receipt of the substrate between the adjacent processing blocks while the substrate is placed on the mount table. Accordingly, simple substrate transportation is obtainable.

[0016] Moreover, it is preferable that the mount table of the substrate treating apparatus allows placement of the n+1 substrates as well as either transfer or receipt of the substrates using the n+1 arms simultaneously. This achieves a shortened substrate transportation time in the mount table, resulting in enhanced throughput of the substrate treating apparatus.

[0017] Moreover, it is preferable that the substrate transport mechanism of the substrate treating apparatus delivers the substrate to and from the processing unit of the processing block below the arm holding the substrate. Accordingly, even when the arm, other than the arms holding the substrates, delivering the substrate to and from the individual processing unit generates dust due to the delivery of the substrate, the arm allows prevention of dust adhesion onto the held substrates.

[0018] Moreover, the substrate treating apparatus of the embodiment includes the transportation path having first and second transportation paths arranged in parallel. The processing block performs processing while transporting the substrate along the first transportation path in a first direction, and performs processing, different from the processing along the first transportation path, while transporting the substrate along the second transportation path in a second direction opposite to the first direction. This achieves circulating transportation of the substrates in one direction along the transportation path in the substrate treating apparatus, resulting in enhanced throughput of the substrate treating apparatus.

[0019] Moreover, the substrate treating apparatus of the embodiment includes the transportation path having first and second transportation paths arranged in series. The processing block performs processing along the first transportation path while transporting the substrate along the first and second transportation paths in a first direction, and performs processing along the second transportation path, different from the processing along the first transportation path, while transporting the substrate along the first and second transportation paths in a second direction opposite to the first direction. This achieves bidirectional transportation of the substrates along the transportation path in the substrate treating apparatus.

[0020] Another embodiment of the present invention discloses a substrate transporting method for a substrate treating apparatus provided with n processing blocks arranged along an identical transportation path and performing an identical process to substrates, the n being a natural number of 2 or larger, an individual processing block of the n processing blocks having at least one processing unit performing a process set in advance to the substrates and a single substrate transport mechanism having arms holding the substrates The

substrate transporting method performed by the substrate transport mechanism includes;

[0021] receiving n substrates of the received substrates from an upstream processing block using n arms of the n+1 arms provided with the substrate transport mechanism;

[0022] delivering one substrate of the n substrates to and from the processing unit in the processing block using one arm of the n arms holding the one substrate of the n substrates to be subjected to a given process by the processing block and one arm of the n arms holding no substrate;

[0023] keeping holding n−1 substrate or substrates of the n substrates using remaining n−1 arm or arms of the n arms with which the n substrates are received while the processing unit processes the one substrate; and transferring the n substrates to a downstream block using the one arm of the n arms holding the one substrate subjected to the given process by the processing block and the n−1 arms of the n arms holding the n−1 substrate or substrates.

Advantageous Effects of Invention

[0024] With the substrate transport apparatus and the substrate transporting method according to the embodiments of the present invention, the substrate transport mechanism delivers the substrate to and from the processing unit (i.e., replaces the substrate) in one of the processing blocks as usual while holding the n−1 substrate or substrates passing through the processing block using the n−1 arm or arms for performing processing in the processing block. Likewise, the substrate transport mechanism transports the substrate in an adjacent processing block to perform the same processing. This results in a reduced number of transportation steps. In addition, the processing blocks have substantially the same number of substrate transportation steps to the processing units. This causes substantially the same time for processing in the processing blocks. Accordingly, suppressing reduction in processing efficiency of parallel processing among the processing blocks is obtainable.

[0025] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF DRAWINGS

[0026] For the purpose of illustrating the invention, there are shown in the drawings several forms which are presently preferred, it being understood, however, that the invention is not limited to the precise arrangement and instrumentalities shown.

[0027] FIGS. **1** and **2** are side views each illustrating a currently-used substrate treating apparatus.

[0028] FIG. **3** is a plan view of a substrate treating apparatus and an upper processing block of a processor of the substrate treating apparatus according to one embodiment of the present invention.

[0029] FIG. **4** is a plan view of a lower processing block of the processor.

[0030] FIG. **5** is a vertical sectional view of the substrate treating apparatus according to the embodiment.

[0031] FIG. **6** is a right side view of the substrate treating apparatus according to the embodiment.

[0032] FIG. **7** is a left side view of the substrate treating apparatus according to the embodiment.

[0033] FIG. **8** is a perspective view of a main transport mechanism according to the embodiment.

[0034] FIGS. **9**A to **9**C each illustrate one example of substrate transportation by the main transport mechanism to a mount table.

[0035] FIGS. **10**A and **10**B illustrates one example of substrate reception and transfer by the main transport mechanism to an individual processing unit (replacing the substrate).

[0036] FIGS. **11**A to **11**F, FIGS. **12**A to **12**F, and FIGS. **13**A to **13**D each illustrate operation of the main transport mechanism.

[0037] FIG. **14** is a flow chart of operation of the substrate treating apparatus.

[0038] FIG. **15** is a side view of a substrate treating apparatus according to another embodiment of the present invention.

[0039] FIGS. **16**A to **16**C, FIGS. **17**A to **17**C, and FIGS. **18**A to **18**D each illustrate operation of a main transport mechanism according to the other embodiment.

DESCRIPTION OF EMBODIMENTS

[0040] The invention is described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure is thorough, and will fully convey the scope of the invention to those skilled in the art. In the drawings, the size and relative sizes of layers and regions may be exaggerated for clarity. Like reference numerals in the drawings denote like elements.

Embodiment 1

[0041] The following describes Embodiment 1 of the present invention with reference to drawings. FIG. **3** is a plan view of a substrate treating apparatus and an upper processing block of a processor of the substrate treating apparatus according to Embodiment 1. FIG. **4** is a plan view of a lower processing block of the processor. FIG. **5** is a vertical sectional view of the substrate treating apparatus according to Embodiment 1.

[0042] Reference is made to FIG. **3**. A substrate treating apparatus **1** forms a resist film on a substrate (e.g., a semiconductor wafer) W, and develops an exposed substrate W. The substrate treating apparatus **1** includes an indexer (hereinafter, referred to as an "ID section") **3**, a processor **5**, and an interface (hereinafter, referred to as an "IF section") **7**. The ID section **3**, the processor **5**, and the IF section **7** are arranged adjacently in this order. In addition, an exposing machine EXP as an external apparatus is provided adjacently to the IF section **7**, the exposing machine EXP being separated from the apparatus **1**. The following describes each construction of the above elements in order.

[0043] [ID Section **3**]

[0044] Now reference is made to any of FIGS. **3** to **5**. The ID section **3** includes carrier mount tables **9**, and transport mechanisms TA**1** and TA**2** inside the ID section (hereinafter, referred to as a "transport mechanism" as appropriate). An individual carrier mount table **9** includes a carrier C accommodating a plurality of substrates (e.g., semiconductor wafers) W. Here, examples of the carrier C include a FOUP (front opening unified pod).

[0045] The transport mechanisms TA**1** and TA**2** each take the substrate W from the carrier C, transports the substrate W to a mount table PS**1** illustrated in FIGS. **4** and **5**, receives the substrate W from a mount table PS**7** illustrated in FIGS. **3** and **5** to be mentioned later, and houses (returns) the substrate to the carrier C. The transport mechanisms TA**1** and TA**2** each include one or more holding arms **11**, and a holding arm supporting table **13**. The holding arm supporting table **13** moves the holding arms **11** vertically and horizontally and turns the holding arms **11** about a vertical (z-direction) axis. The two transport mechanisms TA**1** and TA**2** are arranged side by side in a width direction (Y-direction) of the substrate treating apparatus **1**.

[0046] Here in FIG. **3**, two carrier mount tables **9** are provided. Alternatively, one carrier mount table **9** or three or more carrier mount tables **9** may be provided. The number of transport mechanisms inside the ID section may be three or more. Alternatively, one transport mechanism may be so provided as to be movable in the width direction (Y-direction) of the substrate treating apparatus **1**. The ID section **3** corresponds to the block in the present invention.

[0047] [Outline of Processor **5**]

[0048] The processor **5** is formed by two layers in a vertical direction (Z-direction). Here, the processor **5** includes a total of four processing blocks B**1** to B**4**. In FIG. **5**, a lower layer includes two (n) processing blocks B**1** and B**2** arranged adjacently to each other along the same transportation path RA connecting the ID section **3** with the IF section **7**. An upper layer includes two (n) processing blocks B**3** and B**4** arranged adjacently to each other along the same transportation path RB connecting the ID section **3** with the IF section **7**. The n indicates a natural number. The processing blocks B**1** to B**4** corresponds to the blocks in the present invention. The transportation path RA corresponds to the first transportation path in the present invention. The transportation path RB corresponds to the second transportation path in the present invention. Here, the transportation path RB may correspond to the first transportation path in the present invention, whereas the transportation path RA may correspond to the second transportation path in the present invention.

[0049] The processor **5** performs processing for at least one process to be performed in predetermined orders. Specifically, the processor **5** performs application processing to form a coating film on the substrate W, and performs developing processing to develop the substrate W. That is, the application processing is performed in the two processing blocks B**1** and B**2** in FIG. **4**, and the developing processing is performed in the two processing blocks B**3** and B**4** in FIG. **3**.

[0050] The processing blocks B**1** to B**4** each include at least one processing unit U for performing processing set in advance to the substrate W, and single main transport mechanism TB**1** to TB**4**, respectively, each with three (n+1) arms for holding the substrate W. That is, the processor **5** formed by the four processing blocks B**1** to B**4** includes a total of four main transport mechanisms TB**1** to TB**4**. Here, the main transport mechanisms TB**1** to TB**4** correspond to the substrate transport mechanism in the present invention.

[0051] The present invention has a characteristic concerning to substrate transportation in the processing blocks B**1** to B**4**. For instance, the two processing blocks B**1** and B**2** for performing the application processing are arranged along the transportation path RA. The main transport mechanism TB**1** delivers a substrate W to and from each of the processing units U (replaces a substrate W) while holding a substrate W to be processed in the processing block B**2**. On the other hand, the main transport mechanism TB**2** delivers another substrate W to and from each of the processing units U (replaces a substrate W) while holding the substrate W already processed in the processing block B**1**. Consequently, the processing blocks B**1** and B**2** can obtain substantially the same number of substrate W transportation steps to each of the processing units U. Accordingly, the processing blocks B**1** and B**2** obtain substantially the same time for processing. This achieves suppressing reduction in processing efficiency of the parallel processing among the processing blocks. The processor **5** is to be described later in detail.

[0052] [IF Section **7**]

[0053] The IF section **7** transports the substrate W from the processor **5** to an exposing machine EXP as an external apparatus. Moreover, the IF section **7** returns the substrate W exposed by the exposing machine EXP to the processor **5**. The IF section **7** includes a first transport mechanism adjacent to the processor (hereinafter, referred to as a "transport mechanism" as appropriate) TC**1**, a second transport mechanism adjacent to the processor (hereinafter, referred to as a "transport mechanism" as appropriate) TC**2**, and a single transport mechanism adjacent to the exposing machine (hereinafter, referred to as a "transport mechanism" as appropriate) TD. The transport mechanisms TC**1**, TC**2**, and TD are configured in the same manner as the transport mechanisms TA**1** and TA**2**.

[0054] The IF section **7** further includes at least one processing unit U, a mounting-cum-cooling unit PASS-CP performing either transfer or receipt of the substrate W to or form the exposing machine EXP, a mount table PS**4**, a feed buffer SBF, and a return buffer RBF. The processing unit U includes an edge exposure unit EEW exposing a periphery of the substrate W, and a heating-cooling unit PHP performing heating and cooling successively. See FIGS. **5** to **7**.

[0055] The single edge exposure unit EEW includes a rotation holder (not shown) rotatably holding the substrate W, and a light irradiator (not shown) exposing the periphery of the substrate W held with the rotation holder. The heating-cooling units PHP each perform heating to the exposed substrate W after exposure (PEB: Post Exposure Bake). The IF section **7** may further includes a pre-exposure cleaning unit **21** cleaning and drying the substrate W prior to the exposure, and a post-exposure cleaning unit **23** cleaning and drying the processed substrate W when the exposing machine EXP adopting an immersion method is used.

[0056] The mounting-cum-cooling unit PASS-CP, the mount table PS**4**, the feed buffer SBF, and the return buffer RBF are so configured as to place one or more substrates W. Moreover, one or more edge exposure units EEW, heating-cooling units PHP, pre-exposure cleaning units **21**, and post-exposure cleaning units **23** are provided. Moreover, the edge exposure unit EEW may be provided in each of the two processing blocks B**3** and B**4** of the processor **5**. The types and arrangement of each processing unit U are not limited to the constructions in FIGS. **3** and **5**, and may be set as appropriate. Here, the IF section **7** corresponds to the block in the present invention.

[0057] [Construction of Control System]

[0058] The substrate treating apparatus **1** includes a main controller **31** and an input-output unit **33**. For instance, as illustrated in FIG. **3**, the main controller **31** and the input-output unit **33** are arranged in the ID section **3**. The main controller **31** controls en bloc each element of the ID section

3, the processor **5**, and the IF section **7**. The main controller **31** includes a CPU. Specifically, the main controller **31** controls each operation of the transport mechanisms TB**1** to TB**4** and various processing units U.

[0059] The input-output unit **33** is attached on a side wall of the ID section **3**. The input-output unit **33** displays transportation conditions and processing conditions of the substrates W in the substrate treating apparatus **1**. Moreover, a user allows input of commands into the input-output unit **33**, the commands concerning display on the input-output unit **33** and concerning operation of the transport mechanisms TB**1** to TB**4** as well as various processing units U.

[0060] [Details of Processor **5**]

[0061] The following describes a detailed construction of the processor **5**. As illustrated in FIGS. **3** to **5**, the processor **5** includes the four processing blocks B**1** to B**4**. The processor **5** includes an upper layer in which the two processing blocks B**1** and B**2** are arranged along the same transportation path RA, and a lower layer in which the two processing blocks B**3** and B**4** are arranged along the same transportation path RB. The processing blocks B**1** to B**4** each include at least one processing unit U (indicated by numerals PHP, CP, and HP, for example). Moreover, the processing blocks B**1** to B**4** includes main transport mechanisms TB**1** to TB**4**, respectively. For instance, as illustrated in FIG. **3**, the processing block B**3** includes a plurality of processing units U and a single main transport mechanism TB**3**. Likewise, the processing block B**4** includes a plurality of processing units U and a single main transport mechanism TB**4**.

[0062] The processing blocks B**1** to B**4** include transportation spaces A**1** to A**4**, respectively, for transporting the substrate W between the ID section **3** and the IF section **7** with the main transport mechanisms TB**1** to TB**4**, respectively. The transportation spaces A**1** to A**4** each have the processing units U on both sides thereof.

[0063] The following describes the processing unit U in each of the processing blocks B**1** to B**4**. Regarding a view from the carrier C in FIG. **3** as a front view, FIG. **6** is a right side view of the substrate treating apparatus **1**, and FIG. **7** is a left side view of the substrate treating apparatus **1**. In other words, FIG. **6** illustrates one side of the processing units U and FIG. **7** illustrates the other side of the processing units U across the transportation spaces A**1** to A**4**.

[0064] <Processing Unit U of Processing Block B**1** and B**2**>

[0065] As illustrated in FIG. **6**, the two processing blocks B**1** and B**2** each include an antireflection-film application processing units BARC each forming an antireflection film on the substrate W, and resist-film application processing units RESIST each forming a resist film on the substrate W. The application processing units BARC and RESIST are each arranged in 2 by 2, i.e., two in the horizontal direction and two in the vertical direction.

[0066] As illustrated in FIG. **4**, the application processing units BARC and RESIST each include a rotation holder **41** rotatably holding the substrate W, and a feeder **43** feeding a processing liquid (e.g., a resist liquid) to the substrate W. The feeder **43** selects one of a plurality of nozzle **45**. The feeder **43** is movable between a standby position of the nozzle **45** and a processing position above the substrate W.

[0067] Moreover, the two processing blocks B**1** and B**2** each further include heat treating units **47** each performing a heat treatment to the substrate W. As illustrated in FIG. **7**, the heat treating units **47** each include cooling units CP cooling the substrate W, heating-cooling units PHP heating and cooling the substrate W successively, and adhesion reinforcement processing units PAHP. The adhesion reinforcement processing units PAHP each apply an adhesion reinforcement agent, such as hexamethyldisilazane (HMDS), to the substrate W and thereafter heating the substrate W, thereby enhancing adhesion between the substrate W and the antireflection film. The heat treating units **47** are arranged in 3 by 5, i.e., three in the horizontal direction and five in the vertical direction. Moreover, the heat treating units **47** each include a plate **49** placing the substrate W thereon.

[0068] <Processing Unit U of Processing Block B**3** and B**4**>

[0069] As illustrated in FIG. **6**, the two processing blocks B**3** and B**4** each include developing units DEV developing the substrate W. The developing process units DEV are arranged in 2 by 2, i.e., two in the horizontal direction and two in the vertical direction. As illustrated in FIG. **3**, the developing process units DEV each further include a rotation holder **51** rotatably holding the substrate W and a feeder **53** feeding a developer.

[0070] The two processing blocks B**3** and B**4** each further include a heat treating unit **57** for heat treating to the substrate W. As illustrated in FIG. **7**, the heat treating units **57** each include heating units HP heating the substrate W, cooling units CP cooling the substrate W, and heating-cooling units PHP. The heat treating units **57** are arranged in 3 by 5, i.e., three in the horizontal direction and five in the vertical direction.

[0071] Here, the type and arrangement of various processing units U in the processing blocks B**1** and B**4** are not limited to the constructions in FIGS. **6** and **7**, but are set as appropriate.

[0072] <Construction for Transporting Substrate W>

[0073] The following describes a construction for transporting the substrate W in the processor **5**. In this embodiment, likewise the transportation along two transportation paths RA and RB in FIG. **5**, the substrate W is transported from the processing block B**1** to the processing block B**2**, or from the processing block B**3** to the processing block B**4**.

[0074] The substrate W is subjected to either transfer or receipt through the mount tables PS**1** to PS**3**, and PS**5** to PS**7**. Specifically, the substrate W is transferred or received between the ID section **3** and the processing blocks B**1** and B**4**, between the processing blocks B**1** and B**2**, between the processing blocks B**3** and B**4**, and between the processing blocks B**2** and B**3** and the IF section **7** through the mount tables PS**1** to PS**3**, PS**5** to PS**7**. For instance, the substrate W is transferred or received between the ID section **3** and the processing block B**1** through the mount table PS**1**, and between the processing blocks B**1** and B**2** through the mount table PS**2**.

[0075] The mount tables PS**1** to PS**3** and PS**5** to PS**7** can each place three (n+1) substrates thereon and simultaneously transfer or receive the substrates W using three arms **61***a* to **61***c* to be mentioned later. The mount tables PS**1** to PS**7** each include a sensor (not shown) for detecting whether or not the substrate W is placed thereon. The main transport mechanisms TB**1** to TB**4** each perform either transfer or receipt of the substrates W in accordance with signals from the sensor. The mount tables PS**1** and PS**5** may place two (n) substrates W thereon.

[0076] The main transport mechanisms TB**1** to TB**4** transport the substrates W in the processing blocks B**1** to B**4**,

respectively. The main transport mechanisms TB**1** to TB**4** is so configured to transport the substrates W in the processing blocks B**1** to B**4** using the main transport mechanisms TB**1** to TB**4**, respectively. The main transport mechanisms TB**1** to TB**4** can deliver all the substrates W between all the processing units U in the processing blocks B**1** to B**4** provided with the main transport mechanisms TB**1** to TB**4**, respectively.

[0077] Now the main transport mechanisms TB**1** to TB**4** are to be described. Since the four main transport mechanisms TB**1** to TB**4** have almost the same constructions, the following describes the main transport mechanism TB**1** as one example. FIG. **8** is a perspective view of the main transport mechanisms TB**1** to TB**4**.

[0078] The main transport mechanism TB**1** includes three arms **61***a* to **61***c* holding the substrates W, an arm holder **63** movably holding the three arms **61***a* to **61***c* in the same horizontal direction, and a base **65** rotatably supporting the arm holder **63** around a vertical axis Q (about a Z-direction). The main transport mechanism TB**1** further includes a first guide rail **67** guiding the base vertically, and a second guide rail **69** guiding the base horizontally along the transportation path RA. Accordingly, the first and second guide rails **67** and **69** move the base **65** two-dimensionally. A drive mechanism (not shown), such as a motor, moves the three arms **61***a* to **61***c* horizontally, rotates the arm holder **63**, and moves the base **65** two-dimensionally.

[0079] The following describes the three arms **61***a* to **61***c* of the main transport mechanism TB**1**. The three arms **61***a* to **61***c* are movable individually so as not to interfere with movement thereof when the substrates W are received and transferred. For instance, the arm **61***a* moves in the same direction as the other arms **61***b* and **61***c* so as for the other arms **61***b* and **61***c* not to interfere with movement of the arm **61***a*. Moreover, it is natural to move only one arm for transferring or receiving the substrate W to or from the mount table PS**5**. In addition, it is possible to move two or three arms for transferring or receiving the substrates W simultaneously. Here, as described next in FIG. **9**, the main transport mechanism TB**1** uses two of the three arms **61***a* to **61***c* to receive two substrates W simultaneously from the mount table PS**1**.

[0080] FIGS. **9**A to **9**C each illustrate operation of the main transport mechanism TB**1** transporting the substrates W to the mount table PS**1**. FIG. **9**A illustrates the arms **61***a* to **61***c* prior to receipt of two substrates W. FIG. **9**B illustrates the arms in the process of receiving the two substrates W. FIG. **9**C illustrates the arms after the receipt of the two substrates W.

[0081] As illustrated in FIG. **9**A, the main transport mechanism TB**1** moves the arm holder **63** adjacent to the mount table PS**1**. As illustrated in FIG. **9**B, the main transport mechanism TB**1** moves two of the three arms **61***a* to **61***c*, e.g., upper two arms **61***a* and **61***b*, horizontally to receive the two substrates W placed on the mount table PS**1** simultaneously. Then, as illustrated in FIG. **9**C, the main transport mechanism TB**1** moves the two arms **61***a* and **61***b* horizontally to return them to their original positions and moves the arm holder **63** to the processing unit U.

[0082] FIGS. **10**A and **10**B illustrate one example of delivering the substrates between an individual processing unit (replacing the substrate) with the main transport mechanism TB**1**. As illustrated in FIG. **1** OA, the main transport mechanism TB**1** firstly receives a cooled substrate W in the processing unit U using the arm **61***c* of the three arms **61***a* to **61***c* holding no substrate W. Thereafter, as illustrated in FIG. **10**B, the main transport mechanism TB**1** transfers the substrate W to be subjected to the application process in the processing block B**1** to the processing unit U using one of the two arms holding the substrates W.

[0083] In the above description, the lower processing blocks B**1** and B**2** are provided for the application processing, and the upper processing blocks B**3** and B**4** are provided for the developing processing. Alternatively, the converse is adoptable. That is, the upper processing blocks B**3** and B**4** may be provided for the application processing, and the lower processing blocks B**1** and B**2** may be provided for the developing processing.

[0084] Moreover, in the above description, the two processing block B**1** and B**2** and the two processing blocks B**3** and B**4** are laminated vertically. Alternatively, the two processing block B**1** and B**2** and the two processing blocks B**3** and B**4** may be arranged in parallel so as for the two transportation paths RA and RB to be in the horizontal direction (Y-direction). Moreover, three or more processing blocks may be laminated vertically.

[0085] [Operation of Substrate Treating Apparatus]

[0086] The following describes operation of the substrate treating apparatus **1** according to the embodiment of the present invention. FIGS. **11**A to **11**F (hereinafter, referred to as "FIG. **11**" as appropriate), FIGS. **12**A to **12**F (hereinafter, referred to as "FIG. **12**" as appropriate), and FIGS. **13**A to **13**D (hereinafter, referred to as "FIG. **13**" as appropriate) each illustrate operation of the main transport mechanisms TB**1** to TB**4**. FIG. **12**A is illustrated followed by FIG. **11**F, and FIG. **13**A is illustrated followed by FIG. **12**F. FIG. **14** is a flow chart of the operation of the substrate treating apparatus **1**.

[0087] To simplify the illustration of transporting the substrates in FIGS. **11** to **13**, the substrates W are transported to two of the processing units U illustrated as the heat treating unit **47** and the rotation holder **41**. However, in one embodiment illustrated in FIG. **14**, the substrates W are transported to seven processing units U in a processing block B**1** in Step S**02** and a processing block B**2** in Step S**04**. This case is illustrated by FIG. **13**D, for example. FIG. **13**D illustrates mount tables PS**1** to PS**3** and main transport mechanisms TB**1** and TB**2** each holding two substrates W, and processing blocks B**1** and B**2** each holding one substrate W in seven processing units. Moreover, as illustrated in FIG. **14**, substrates W are transported to four processing unit U in order in a processing block B**3** in Step S**08** and a processing block B**4** in Step S**10**. FIGS. **11** to **13** include numerals W**1**, W**2** and the like each indicating a number of the substrate W transported in order to the mount table PS**1** and the like. The substrate is indicated as the "substrate W" when no distinguish is made to the number given to the substrate W.

[0088] Firstly, the following describes operation of the two main transport mechanisms TB**1** and TB**2** with reference to FIGS. **11** to **13**. Since operation of two main transport mechanisms TB**3** and TB**4** is identical to operation of the main transport mechanisms TB**1** and TB**2**, the description thereof is to be omitted.

[0089] In FIG. **11**A, the mount table PS**1** contains two substrates W**1** and W**2** transported with the transport mechanism TA**1** in the ID section **3**. The main transport mechanism TB**1** in the processing block B**1** receives two (n) substrates W**1** and W**2** from the upstream ID section **3** via the mount table PS**1** simultaneously with lower two (n) arms **61***b* and **61***c* among three (n+1) arms **61***a* to **61***c*. That is, the main transport mechanism TB**1** receives the two substrates W**1** and

W**2** from the mount table PS**1** simultaneously. At this time, an arm holder **63** of the main transport mechanism TB**1** (see FIG. **5**) is located adjacent to the upstream ID section **3** (adjacent to the mount table PS**1**) upstream of the downstream processing block B**2** along the transportation path RA.

[0090] In FIG. **11**B, one substrate W**1** of the received two substrates W**1** and W**2** is processed in the processing block B**1**. The other one (n−1) substrate W**2** is held with the arm **61***c*, for example, for processing in the next processing block B**2**. The main transport mechanism TB**1** delivers (replaces) the substrate W to and from the processing unit U in the processing block B**1** using one arm **61***b* and one arm **61***a*, the arm **61***b* holding one substrate W**1** of the received two (n) substrates W**1** and W**2** to be processed in the processing block B**1**, and the arm **61***a* holding no substrate W.

[0091] In FIG. **11**B, the main transport mechanism TB**1** only transfers the substrate W**1** to the processing unit U (heat treating unit **47**) since the processing unit U (heat treating unit **47**) contains no substrate W. Accordingly, delivering the substrate W includes at least either transferring the substrate W or receiving the substrate W.

[0092] In FIG. **11**C, the main transport mechanism TB**1** transfers the substrate W**2** via the mount table PS**2** to the downstream processing block B**2** using the arm **61***c* before completion of processing the substrate W in the processing unit U. That is, the main transport mechanism TB**1** transports the substrate W**2** to the mount table PS**2**. At this time, the arm holder **63** of the main transport mechanism TB**1** is located adjacent to the processing block B**2** (adjacent to the mount table PS**2**) downstream of the upstream ID section **3** along the transportation path RA.

[0093] In FIG. **11**D, the mount table PS**1** contains other two substrates W**3** and W**4** transported by the transport mechanism TA**1** of the ID section **3**. Like the construction in FIG. **11**A, the main transport mechanism TB**1** in the processing block B**1** receives the two substrates W**3** and W**4** from the mount table PS**1** with two arms **61***b* and **61***c* simultaneously.

[0094] The main transport mechanism TB**2** in the processing block B**2** receives the substrate W**2** from the mount table PS**2** with the arm **61***c*. At this time, an arm holder **63** of the main transport mechanism TB**2** (see FIG. **5**) is located adjacent to the upstream processing block B**1** (adjacent to the mount table PS**2**) along the transportation path RA. Here, there is no need to synchronize the receipt of the substrate W**2** by the main transport mechanism TB**2** with the receipt of the substrates W**3** and W**4** by the main transport mechanism TB**1**. In other words, the main transport mechanism TB**2** may receive the substrate W**2** immediately after the substrate W**2** is transported to the mount table PS**2** so as for the main transport mechanism TB**1** not to interfere with the arms **61***a* to **61***c*. Consequently, the substrate W**2** can be transported to the processing unit U rapidly.

[0095] In FIG. **11**E, the main transport mechanism TB**1** in the processing block B**1** delivers the substrate W to the processing unit U in the processing block B**1** using the arm **61***b* and the arm **61***a*, the arm **61***b* holding one substrate W**3** of the received two (n) substrates W**3** and W**4** to be processed in the processing block B**1**, and the arm **61***a* holding no substrate W. That is, the main transport mechanism TB**1** delivers the substrates W**1** and W**3** to and from the processing unit U using the two arms arm **61***a* and **61***b*.

[0096] The main transport mechanism TB**2** of the processing block B**2** transfers the substrate W**2** to the processing unit U (heat treating unit **47**).

[0097] In FIG. **11**F, the main transport mechanism TB**1** of the processing block B**1** delivers the substrate W to and from the processing unit U in the processing block B**1** using the arm **61***a* and the arm **61***b*, the arm **61***a* holding one substrate W**4** of the received two (n) substrates W**4** and W**4** to be processed in the processing block B**1**, and the arm **61***b* holding no substrate W. In FIG. **11**F, since the processing unit U (rotation holder **41**) contains no substrate W, the main transport mechanism TB**1** transfers only the substrate W**1** to the processing unit U (rotation holder **41**).

[0098] In FIG. **12**A, like the construction in FIG. **11**C, the main transport mechanism TB**1** in the processing block B**1** transfers the substrate W**4** via the mount table PS**2** to the downstream processing block B**2** using the arm **61***c* before the processing unit U completes processing to the substrate W**1**. That is, the main transport mechanism TB**1** transports the substrate W**4** to the mount table PS**2**.

[0099] In FIG. **12**B, the mount table PS**1** contains other two substrates W**5** and W**6** transported by the transport mechanism TA**1** in the ID section **3**. Like the construction in FIG. **11**A, the main transport mechanism TB**1** in the processing block B**1** receives the substrates W**5** and W**6** simultaneously from the mount table PS**1** simultaneously.

[0100] Like the construction in FIG. **11**D, the main transport mechanism TB**2** of the processing block B**2** receives the substrate W**4** from the mount table PS**2** using one arm **61***c*.

[0101] In FIG. **12**C, like the construction in FIG. **11**E, the main transport mechanism TB**1** of the processing block B**1** delivers the substrates W to and from the processing unit U in the processing block B**1** using the arm **61***b* and the arm **61***a*, the arm **61***b* holding one substrate W**5** of the received two (n) substrates W**5** and W**6** to be processed in the processing block B**1**, and the arm **61***a* holding no substrate W. That is, the main transport mechanism TB**1** delivers the substrates W**3** and W**5** to and from the processing unit U using the two arms arm **61***a* and **61***b*.

[0102] The main transport mechanism TB**2** of the processing block B**2** delivers the substrates W to and from the processing unit U of the processing block B**2** using the arm **61***c* holding the substrate W**4** to be processed in the processing block B**2** and the arm **61***a* holding no substrate W. That is, the main transport mechanism TB**2** delivers the substrates W**2** and W**4** to and from the processing unit U using the arms **61***a* and **61***c*.

[0103] In FIG. **12**D, the main transport mechanism TB**1** in the processing block B**1** delivers the substrates W to the processing unit U in the processing block B**1** using the arm **61***a* and the arm **61***b*, the arm **61***a* holding one substrate W**3** of the received two (n) substrates W**3** and W**6** to be processed in the processing block B**1**, and the arm **61***b* holding no substrate W. That is, the main transport mechanism TB**1** delivers the substrates W**1** and W**3** to and from the processing unit U using the two arms arm **61***a* and **61***b*. Here in FIGS. **12**C and **12**D, the arm **61***c* of the main transport mechanism TB**1** keeps holding the substrate W**6**.

[0104] The main transport mechanism TB**2** of the processing block B**2** delivers the substrate W to and from the processing unit U in the processing block B**2** using the arm **61***a* holding one substrate W**2** to be processed in the processing block B**2**, and the arm **61***c* holding no substrate W. In FIG. **12**D, since the processing unit U (rotation holder **41**) contains no substrate W, the main transport mechanism TB**2** transfers only the substrate W**2** to the processing unit U (rotation holder **41**).

[0105] In FIG. **12**E, the main transport mechanism TB**1** of the processing block B**1** transfers the two substrates W**1** and W**6** simultaneously via the mount table PS**2** to the downstream processing block B**2** using the arms **61***b* and **61***c*, the arm **61***b* holding the substrate W**1** subjected to a given (preset) process in the processing block B**1**, and the one (n−1) arm **61***c* holding one (n−1) substrate W**6**. That is, the main transport mechanism TB**1** transports the two substrates W**1** and W**6** simultaneously to the mount table PS**2**. At this time, the arm holder **63** in the main transport mechanism TB**1** (see FIG. **5**) is located adjacent to the downstream processing block B**2** (adjacent to the mount table PS**2**) along the transportation path RA.

[0106] In FIG. **12**F, the mount table PS**1** contains other two substrates W**7** and W**8** transported by the transport mechanism TA**1** in ID section **3**. Likewise the construction in FIG. **11**A, the main transport mechanism TB**1** of the processing block B**1** receives the two substrates W**7** and W**8** simultaneously from the mount table PS**1**.

[0107] The mount table PS**2** contains the transported two substrates W**1** and W**6**. The main transport mechanism TB**2** of the processing block B**2** receives the two substrates W**1** and W**6** simultaneously via the mount table PS**2** from the upstream processing block B**1** using the two arms **61***b* and **61***c* of the three arms **61***a* to **61***c*. That is, the main transport mechanism TB**2** receives the two substrates W**1** and W**6** simultaneously from the mount table PS**2**. At this time, the arm holder **63** of the main transport mechanism TB**2** is located adjacent to the upstream processing block B**1** (adjacent to the mount table PS**2**) along the transportation path RA.

[0108] In FIG. **13**A, likewise the construction in FIG. **11**E, the main transport mechanism TB**1** in the processing block B**1** delivers the substrates W to the processing unit U in the processing block B**1** using the arms **61***b* and **61***a*, the arm **61***b* holding the substrate W**7** of the two received substrates W**7** and W**8** to be processed in the processing block B**1**, and the arm **61** holding no substrate W. That is, the main transport mechanism TB**1** delivers the substrates W**5** and W**7** to and from the processing unit U using the two arms **61***a* and **61***b*.

[0109] The substrate W**6** of the received two substrates W**1** and W**6** is processed in the processing block B**2**. The other one (n−1) substrate W**1** is held with the arm **61***b* for passing through the processing block B**2**. The main transport mechanism TB**2** of the processing block B**2** delivers the substrate W to and from the processing unit U in the processing block B**2** using the arms **61***c* and **61***a*, the arm **61***c* holding the substrate W**6** of the received two substrates W**1** and W**6** to be processed in the processing block B**2**, the arm **61***a* holding no substrate W. That is, the main transport mechanism TB**2** delivers the substrates W**4** and W**6** to and from the processing unit U using the two arms **61***a* and **61***c*.

[0110] In FIG. **13**B, like the construction in FIG. **12**D, the main transport mechanism TB**1** of the processing block B**1** delivers the substrate W to and from the processing unit U in the processing block B**1** using the arms **61***a* and **61***b*, the arm **61***a* holding the substrate W**5** of the received two substrates W**5** and W**8** to be processed in the processing block B**1**, the arm **61***b* holding no substrate W. That is, the main transport mechanism TB**1** delivers the substrates W**3** and W**5** to and from the processing unit U using the two arms **61***a* and **61***b*.

[0111] The main transport mechanism TB**2** of the processing block B**2** delivers the substrates W to and from the processing unit U in the processing block B**2** using the arms **61***a* and **61***c*, the arm **61***a* holding the substrate W**4** of the received two substrates W**1** and W**4** to be processed in the processing block B**2**, and the arm **61***c* holding no substrate W. That is, the main transport mechanism TB**2** delivers the substrates W**2** and W**4** to and from the processing unit U using the two arms **61***a* and **61***c*. Here in FIGS. **13**A and **13**B, the arm **61***b* of the main transport mechanism TB**2** keeps holding the substrate W**1**.

[0112] In FIG. **13**C, like the construction in FIG. **12**E, the main transport mechanism TB**1** of the processing block B**1** transfers the two substrates W**3** and W**8** simultaneously via the mount table PS**2** to the downstream processing block B**2** using the arms **61***b* and **61***c*, the arm **61***b* holding the substrate W**3** being subjected to a given process in the processing block B**1**, and the arm **61***c* holding the substrate W**8**. That is, the main transport mechanism TB**1** transports the two substrates W**3** and W**8** simultaneously to the mount table PS**2**.

[0113] The main transport mechanism TB**2** of the processing block B**2** transfers the two substrates W**1** and W**2** simultaneously via the mount table PS**3** to the downstream IF section **7** using the arms **61***c* and **61***b*, the arm **61***c* holding the substrate W**2** subjected to the given process in the processing block B**2** and the arm **61***b* holding the substrate W**1**. That is, the main transport mechanism TB**2** transports the two substrates W**1** and W**2** simultaneously to the mount table PS**3**. At this time, the arm holder **63** of the main transport mechanism TB**2** is located adjacent to the downstream IF section **7** (adjacent to the mount table PS**3**) along the transportation path RA.

[0114] One repeat of the operation in FIGS. **12**F to **13**C causes the mount table PS**3** to contain the two transported substrates W**3** and W**4**.

[0115] The following describes a flowchart about the operation of the substrate treating apparatus **1** with reference to FIG. **14**. FIG. **14** illustrates Steps S**01** to S**11** in which the substrates W are fed out from the carrier C on the carrier mount table **9** (see FIG. **5**), subjected to a given process, and accommodated (returned) in the carriers C. Firstly, application processing by the two (n) processing blocks B**1** and B**2** in Steps S**01** to S**5** is to be described, and thereafter, processing by the IF section **7** and the exposing machine EXP in Step S**06** is to be described.

[0116] [Step S**01**] Substrate Transportation Via Mount Table PS**1**

[0117] A user or a carrier transport device (not shown) transports the carrier C accommodating the substrates W to the carrier mount table **9** of the ID section **3**. The transport mechanism TA**1** in the ID section **3** feeds out a substrate W from the carrier C and transports the substrate W to the mount table PS**1**. The transport mechanism TA**1** transports the substrates W accommodated in the carrier C to the mount table PS**1** successively.

[0118] The main transport mechanism TB**1** receives two (n) substrates W simultaneously from the upstream ID section **3** via the mount table PS**1** using lower two (n) arms **61***b* and **61***c* of three (n+1) arms **61***a* to **61***c*. See FIG. **12**B. At this time, the arm holder **63** of the main transport mechanism TB**1** is located adjacent to the upstream ID section **3** along the transportation path RA. The received two substrates W are not subjected to the same processing (application processing).

[0119] [Step S**02**] Process by Processing Block B**1**

[0120] The processing block B**1** performs a series of processes concerning the application processing. The series of processes includes seven processes in the cooling unit CP, an antireflection film application processing unit BARC, a heating-cooling unit PHP, a cooling unit CP, a resist film applica-

tion processing unit RESIST, a heating-cooling unit PHP, and a cooling unit CP performed in this order. An adhesion reinforcement processing unit PAHP may be used as necessary. The application processing does not need to include the above seven processes, but may include other numbers of processes. Alternatively, the seven processes may be performed in the processing block B1 in parallel.

[0121] At this time, the main transport mechanism TB**1** proceeds with the application processing in the processing block B**1** with the remaining two arms while holding one substrate W of the two substrates W received from the mount table PS**1**. See FIGS. **12**C and **12**D.

[0122] That is, the one substrate W of the receiver two substrates W are processed in the processing block B**1**. The remaining one substrate W is held with the arm **61***c*, for example, for the next processing block B**2**. Specifically, the main transport mechanism TB**1** delivers (replaces) the substrate W to and from the processing unit U in the processing block B**1** using the arms **61***b* and **61***a*, the arm **61***b* holding the substrate W of the two (n) substrates W to be processed in the processing block B**1**, and the arm **61***b* holding no substrate W. In addition, the main transport mechanism TB**1** keeps holding the one (n−1) substrate W with the remaining one (n−1) arm **61***c* receiving the substrate W while the delivered substrate W is processed in the processing unit U. That is, the main transport mechanism TB**1** keeps holding one substrate W while another substrate W is delivered to and from the processing unit U.

[0123] In FIGS. **12**C and **12**D, the main transport mechanism TB**1** keeps holding the substrate W**6** using the arm **61***c* while the processing unit U processes the delivered substrate W. The processing during the process of the substrate W by the processing unit U corresponds to a process in seven processing units U, such as the cooling unit CP, in step S**02** in FIG. **14**, and corresponds to a process by two processing units where the substrates W**1** and W**5** exist in FIG. **12**C. That is, in FIGS. **12**B to **12**D, a period of time while the processing unit U processes the substrate W corresponds to time from when the main transport mechanism TB**1** receives the substrates W**5** and W**6** simultaneously to time when the main transport mechanism TB**1** delivers the substrate W to and from the processing unit U and receives the substrate W**1** processed in the two processing units U. Here, the constructions of the main transport mechanisms TB**2** to TB**4** are each similar to the construction of the main transport mechanism TB**1**.

[0124] [Step S**03**] Substrate Transportation Via Mount Table PS**2**

[0125] Either the arm **61***a* or **61***b* transferring and receiving the substrate W with the processing unit U receives the substrate W subjected to a given process in the processing block B**1** (step S**2**). Thereafter, the main transport mechanism TB**1** transfers the two substrate W to the downstream processing block B**2** via the mount table PS**2** using the arm **61***b* and **61***c*, the arm **61***b* holding the substrate W subjected to a given process in the processing block B**1**, and the one (n−1) arm **61***c* holding the one (n−1) substrate W. See FIG. **12**E. That is, the main transport mechanism TB**1** transports the two substrates W, i.e., the substrate W subjected to the process in the processing block B**1** and the substrate W to be subjected to a process in the processing block B**2**, to the mount table PS**2**. At this time, the arm holder **63** of the main transport mechanism TB**1** is located adjacent to the downstream processing block B**2** along the transportation path RA.

[0126] The main transport mechanism TB**1** in the processing block B**1** transports the substrate W to the mount table PS**2**, and thereafter, the main transport mechanism TB**2** in the processing block B**2** receives the two substrates W simultaneously from the upstream processing block B**1** via the mount table PS**2** using the lower two arm **61***b* and **61***c* of the three arms **61***a* to **61***c*. See FIG. **12**F. At this time, the arm holder **63** of the main transport mechanism TB**2** is located adjacent to the upstream processing block B**1** along the transportation path RA.

[0127] Moreover, in FIGS. **12**B to **12**F, the transport mechanism TA**1** in the ID section **3** transports two substrates W to be processed next in the two processing block B**1** and B**2** to the mount table PS**1** while the two substrates W are transported from the mount table PS**1** to the mount table PS**2**. The main transport mechanisms TB**1** and TB**2** receive the two substrates W at substantially the same timing.

[0128] [Step S**04**] Process by Processing Block B**2**

[0129] The processing block B**2** performs a series of given processes concerning application processing. Since the processing block B**2** performs the same process as the process of the processing block B**1** in Step S**02**, the series of processes is to be omitted.

[0130] The main transport mechanism TB**2** delivers (replaces) the substrates W to and from the processing unit U in the processing block B**2** using one arm **61***c* and one arm **61***a*, the arm **61***c* holding one substrate W of the received two substrates W to be processed in the processing block B**2**, and the arm **61***a* holding no substrate W. See FIGS. **13**A and **13**B. Moreover, the main transport mechanism TB**2** keeps holding one substrate W with the remaining one arm **61***b* having received the substrate W while the substrates W are processed in the processing units U. The held substrate W is the substrate W processed by the processing block B**1**.

[0131] [Step S**05**] Substrate Transportation Via Mount Table PS**3**

[0132] Either the arm **61***a* or the arm **61***c* that delivers the substrates W to and from the processing unit U receives the substrate W subjected to the given process in the processing block B**2** (Step S**4**). Thereafter, the main transport mechanism TB**2** transfers the two substrate W to the downstream IF section **7** via the mount table PS**3** using the arm **61***c* and **61***b*, the arm **61***c* holding the substrate W subjected to a given process in the processing block B**2**, and the arm **61***b* holding the substrate W. See FIG. **13**C. That is, the main transport mechanism TB**2** transports the two substrates W subjected to the process in the processing blocks B**1** and B**2** to the mount table PS**3**. At this time, the arm holder **63** of the main transport mechanism TB**2** is located adjacent to the downstream IF section **7** along the transportation path RA.

[0133] As noted above, the two substrates W transported to the mount table PS**3** at the same timing are substrates W subjected to the application processing in the processing blocks B**1** and B**2**. Consequently, at the mount table PS**3**, the two processing blocks B**1** and B**2** have already performed the application processing simultaneously to the two substrates. That is, the two processing blocks B**1** and B**2** perform parallel processing. The two main transport mechanism TB**1** and TB**2** each hold the substrate W with the arm **61***c* while transferring and receiving (replacing) the substrate W with the processing unit U as usual using the remaining arms **61***a* and **61***b* in the processing blocks B**1** and B**2**. In addition, the processing blocks B**1** and B**2** perform the same application processing. This achieves the decreased number of substrate W transpor-

tation steps. Moreover, the processing units U has almost the substantially number of substrate W transportation steps, achieving substantially the same time for application processing by the processing blocks B1 and B2.

[0134] The main transport mechanism TB1 receives two substrates W simultaneously from the upstream ID section 3. The main transport mechanism TB1 transfers two substrates W simultaneously to the downstream processing block B2. Consequently, a shortened substrate transportation time is obtainable, resulting in enhanced throughput of the substrate treating apparatus 1.

[0135] After the mount table PS3 receives the substrates W, a first transport mechanism TC1 adjacent to the processor in the IF section 7 in FIG. 5 receives the substrates W from the mount table PS3.

[0136] [Step S06] Process by IF Section 7 and Exposing Machine EXP

[0137] The IF section 7 conducts pre-processing and post-processing for the exposing machine EXP as an external apparatus performing exposure. Transport mechanisms TC1, TC2, and TD transport the substrates W. The substrates W are processed by an edge exposure unit EEW, a mounting-cum-cooling unit PASS-CP, an exposing machine EXP, a mount table PS4, and heating-cooling unit PHP in this order. In addition, a pre-exposure cleaning unit 21 and a post-exposure cleaning unit 23 may process the substrates W as necessary.

[0138] The following describes a developing step in Steps S07 to S11 by the two processing blocks B3 and B4. Here, the processing blocks B3 and B4 transport the substrates in a similar manner to the processing blocks B1 and B2, and thus the description thereof is to be made simply. In FIGS. 12B to 13C, the construction of the processing block B1 is referred for the construction of the processing block B3, and the construction of processing block B2 is referred for the construction of the processing block B4.

[0139] [Step S07] Substrate Transportation Via Mount Table PS5

[0140] The transport mechanism TC2 transports the substrates W processed by the heating-cooling unit PHP in IF section 7 to the mount table PS5. The main transport mechanism TB3 of the processing block B3 receives two substrates W placed in the mount table PS5 simultaneously using the lower two arms 61*b* and 61*c* of the three arms 61*a* to 61*c*. See FIG. 12B.

[0141] [Step S08] Process by Processing Block B3

[0142] The processing block B3 performs a series of given processes concerning the developing step. The series of processes corresponds to four processes performed by the cooling unit CP, the developing process unit DEV, the heating unit HP, and the cooling unit CP, in this order. At this time, the main transport mechanism TB3 holds one of the two substrates W received from the mount table PS5 while proceeding with the developing steps (processing) in the processing block B3 using the remaining two arms 61*a* and 61*b*. See FIGS. 12C and 12D. Moreover, the heating-cooling unit PHP may perform processing as necessary. Moreover, the developing step is not limited to the four processes. Alternatively, the developing step may have another number of processes. Alternatively, the four processes may be performed in parallel by the processing block B3.

[0143] [Step S09] Substrate Transportation Via Mount Table PS6

[0144] The main transport mechanism TB3 transports the two substrates W, i.e., the substrate W processed in the processing block B3 and the substrate W to be processed in the processing block B4, to the mount table PS6. See FIG. 12E.

[0145] After the main transport mechanism TB3 of the processing block B3 transports the substrates W to the mount table PS6, the main transport mechanism TB4 of the processing block B4 receives the two substrates W placed in the mount table PS6 simultaneously using the lower two arms 61*b* and 61*c* of the three arms 61*a* to 61*c*. See FIG. 12F.

[0146] In FIGS. 12B to 12F, the transport mechanism TC2 of the IF section 7 transports two substrates W to be processed next in the two processing blocks B3 and B4 to the mount table PS5 while the two substrates W in the mount table PS5 are transported to the mount table PS6. The two main transport mechanisms TB3 and TB4 each receive the two substrates W at substantially the same timing.

[0147] [Step S10] Process by Processing Block B4

[0148] The processing block B4 performs a series of processes concerning a developing step. The processing block B4 performs the same process as the processing block B3 in Step S08, and thus the description thereof is to be omitted. The main transport mechanism TB4 holds one of the two substrates W received from the mount table PS6 while proceeding with the developing step in the processing block B4 using the remaining two arms 61*a* and 61*c*. See FIGS. 13A and 13B.

[0149] [Step S11] Substrate Transportation Via Mount Table PS7

[0150] The main transport mechanism TB4 transports the two substrates W subjected to developing processing by the two processing blocks B3 and B4 to the mount table PS7. See FIG. 13C. After the main transport mechanism TB4 transports the substrates W to the mount table PS7, the transport mechanism TA2 of the ID section 3 in FIG. 3 receives the substrates W transported to the mount table PS7, and accommodates the substrates W to the carrier C of the carrier mount table 9. Here, the substrates W are subjected to the application processing, exposure processing, and developing processing. Then, all the substrates W are returned, and thereafter, the user or the carrier transport mechanism (not shown) moves the carrier C from the carrier mount table 9.

[0151] The carriers C with all the substrates W removed therefrom are moved from the carrier mount table 9 adjacent to the transport mechanism TA1 to the carrier mount table 9 adjacent to the transport mechanism TA2. The main transport mechanisms TB1 to TB4 of the processing blocks B1 to B4 are individually controlled by sensors provided in the mount tables PS1 to PS3 and PS5 to PS7. The sensors each detect presence or absence of the substrate W.

[0152] The substrate transport mechanisms TB1 to TB4 of the embodiment include three arm 61*a* to 61*c* corresponding to the number of two processing blocks. The following describes operation of the substrate transport mechanisms TB1 to TB4 taking the substrate transport mechanism TB1 as one example. The substrate transport mechanism TB1 receives the two substrates W from the upstream ID section 3 using the two arms 61*b* and 61*c* of the three arms 61*a* to 61*c*. Then, the substrate transport mechanism TB1 delivers the substrates W to and from the processing unit U of the processing block B1 using the arm 61*b* holding one of the two substrates W to be processed in the processing block B1 and the arm 61*a* holding no substrate W. The substrate transport mechanism TB1 keeps holding one substrate W with the remaining one (n−1) arm 61*c* of the arms having received the substrates W while the substrate W is processed in the pro-

cessing unit U. Thereafter, the substrate transport mechanism TB**1** transfers the two substrates W to the downstream processing block B**2** using the arm **61***a* holding the substrate W subjected to a given process by the processing block B**1** and the arm **61***c* holding the substrate W.

[0153] That is, the substrate transport mechanism TB**1** delivers (replaces) the substrate W to and from the processing unit U in the processing block B**1** as usual while holding the substrate W passing through the processing block B**1** using the arm **61***c* for performing the application process (processing) to the processing block B**1**. Like the processing block B**1**, the substrates are transported in the next processing block B**2** to be subjected to the same application process. This results in a reduced number of transportation steps. In addition, the processing blocks B**1** and B**2** have approximately the same number of substrate transportation steps to the processing unit. This causes substantially the same time for processing in the processing blocks B**1** and B**2**. Accordingly, suppressing reduction in processing efficiency of parallel processing between the processing blocks B**1** and B**2** as well as between the processing blocks B**3** and B**4** is obtainable.

[0154] The embodiment of the present invention achieves approximately the same number of substrate W transportation steps. Alternatively, to obtain more approximately the same number thereof, the processing blocks B**1** and B**2** as well as the processing blocks B**3** and B**4** may have the same arrangement or the same number of processing units U.

[0155] The substrate transport mechanisms TB**1** to TB**4** each further include an arm holder **63** that supports the arms **61***a* to **61***c* so as to move the arms horizontally and to be movable along the transportation paths RA and RB. For instance, when the arm holder **63** is located adjacent to the upstream ID section **3** along the transportation path RA, the substrate transport mechanism TB**1** receives two substrates W from the upstream ID section **3**. When the arm holder **63** is located adjacent to the downstream processing block B**2** along the transportation path RA, the substrate transport mechanism TB**1** transfers two substrates to the downstream processing block B**2**.

[0156] This achieves suppressing reduction in processing efficiency of parallel processing among the processing blocks with the arm holder **63** holding the arms **61***a* to **61***c* being moved when the two substrates W are received from the upstream ID section **3** or are transferred to the downstream processing block B**2**.

[0157] In addition, the substrate treating apparatus **1** further includes the mount table PS**2** provided between the adjacent processing blocks B**1** and B**2**. The mount table P**2** places the substrate W thereon for transferring or receiving the substrate W. Consequently, the substrate W to be transferred or received to or from the two adjacent processing blocks B**1** and B**2** is placed on the mount table PS**2**, resulting in ready transfer or receipt of the substrate W.

[0158] The mount table PS**2** allows either transfer or receipt of three substrates W. In addition, the mount table PS**2** allows either receipt or transfer of the substrate W simultaneously using the three arms **61***a* to **61***c*. This achieves shortened substrate transportation time in the mount table PS**2**, resulting in enhanced throughput of the substrate treating apparatus.

[0159] The transportation path RA and the transportation path RB are arranged in parallel. The processing blocks B**1** to B**4** each transport the substrate W in the first direction along the transportation path RA while performing the application process, and transport the substrate W in the second direction, opposite to the first direction, along the transportation path RB while performing the developing process performed differently along the transportation path RA. This achieves transportation of the substrate W in one direction so as for the substrate W to circulate along the transportation paths RA and RB in the substrate treating apparatus **1**, resulting in enhanced throughput of the substrate treating apparatus **1**.

Embodiment 2

[0160] The following describes Embodiment 2 of the present invention with reference to drawings. FIG. **15** is a side view of a substrate treating apparatus **1** according to Embodiment 2. Here, the description common to that of Embodiment 1 is to be omitted.

[0161] In Embodiment 1, as illustrated in FIG. **5**, the two transportation paths RA and RB are arranged in parallel. The lower two processing blocks B**1** and B**2** and the upper two processing blocks B**3** and B**4** are laminated vertically. The four processing blocks B**1** to B**4** transport the substrates W from the ID section **3** to IF section **7** along the transportation path RA in the first direction while performing the application process, and transport the substrates W along the transportation path RB in the second direction, opposite to the first direction, while performing the developing process. That is, the four processing blocks B**1** to B**4** transport the substrates W in one direction.

[0162] In contrast to this, in Embodiment 2, two transportation paths RA and RB are arranged in series, and four processing blocks B**1** and B**4** are arranged horizontally, as illustrated in FIG. **15**. The four processing blocks B**1** to B**4** transport substrates W from an ID section **3** to an IF section **7** along the two transportation paths RA and RB in a first direction while performing an application process along the transportation path RA, and transport the substrates W along the two transportation paths RA and RB in a second direction, opposite to the first direction, while performing a developing process along the transportation path RB. That is, the four processing blocks B**1** to B**4** transport the substrates W bidirectionally.

[0163] As illustrated in FIG. **15**, a mount table PS**11***a* and a mount table PS**11***b* are provided between the ID section **3** and the processing block B**1**. The mount table PS**11***a* transports the substrates W in the first direction, and the mount table PS**11***b* transports the substrates in the second direction. Likewise, mount tables PS**12***a* to PS**14***a* and mount tables PS**12***b* to PS**14***b* are provided each among the two adjacent processing blocks B**1** to B**4**. The mount tables PS**12***a* to PS**14***a* transport the substrates W in the first direction. The mount tables PS**12***b* to PS**14***b* transport the substrates W in the second direction. Moreover, mount table PS**15***a* and mount table PS**15***b* are provided between the processing block B**4** and the IF section **7**. The mount table PS**15***a* transports the substrate W in the first direction, and the mount table PS**15***b* transports the substrates W in the second direction.

[0164] Here, the two processing blocks B**1** and B**2** may be exchanged with the two processing blocks B**3** and B**4** such that an application process is performed along the transportation path RB and a developing process is performed along the transportation path RA. Moreover, the processor **5** in FIG. **15** is formed by one layer. Alternatively, the processor **5** may be formed by two layers vertically. Moreover, the processor **5** may be formed by more than two rows in a depth direction of FIG. **15** (Y-direction).

[0165] The following describes operation of the processor **5** of the substrate treating apparatus **1**. FIGS. **16**A to **16**C (hereinafter, referred to as "FIG. **16**" as appropriate), FIGS. **17**A to **17**C (hereinafter, referred to as "FIG. **17**" as appropriate), and FIGS. **18**A to **18**C (hereinafter, referred to as "FIG. **18**" as appropriate) each illustrate operation of four main transport mechanisms TB**1** to TB**4**. FIG. **17**A is illustrated followed by FIG. **16**C, and FIG. **18**A is illustrated followed by FIG. **17**C.

[0166] Here, an application process by the two processing blocks B**1** and B**2**, and a developing process by the two processing blocks B**3** and B**4** are same as those in Embodiment 1, and thus the description thereof is to be omitted. In FIGS. **16** to **18**, for simpler illustration of substrate transportation, one processing unit U completes processing to a substrate, and thereafter transports the substrate to a next processing block. The main transport mechanisms TB**1** to TB**4** in the processing blocks B**1** to B**4**, respectively, transport substrates W in the same manner as in FIGS. **11** to **13**. Consequently, the description thereof is to be omitted. FIGS. **16** to **18** include numerals W**1**, W**2** and the like each indicating a number of a substrate W transported in order to the mount table PS**1** and the like. The substrate is indicated as the "substrate W" when no distinguish is made to the number given to the substrate W.

[0167] FIGS. **16** to **18** illustrates operation in the first direction from the processing block B**1** to the processing block B**4** and operation in the second direction from the processing block B**4** to the processing block B**1**. The substrates are transported in a similar manner.

[0168] In FIG. **18**D, the main transport mechanism TB**3** in the processing block B**3** transports two substrates W to the mount table PS**14***a*, the substrates W being subjected to the application process by the processing blocks B**1** and B**2** and placed on the mount table PS**13***a*. The main transport mechanism TB**4** in the processing block B**4** transports the substrates W transported by the mount table PS**14***a* to the mount table PS**15***a*.

[0169] As noted above, for transporting the substrates W from the processing block B**1** to the processing block B**4**, the two processing blocks B**1** and B**2** perform the application process, and the two processing blocks B**3** and B**4** perform only transportation for passing the substrates. The following describes one example of the transportation for passing the substrates. Specifically, in FIG. **17**C, the main transport mechanism TB**1** transports two substrates W to the mount table PS**12***a*, and thereafter receives two substrates W placed on the mount table PS**12***b* subjected to the developing process. Then, the main transport mechanism TB**1** performs transportation for passing the substrates through the processing block B**1** to transport the substrates to the mount table PS**11***b*, and receives two substrates W to be subjected to application process by the two processing blocks B**1** and B**2** from the mount table PS**11***a*. Such a substrate transporting method is performed in a similar manner in the processing blocks B**2** to B**4**.

[0170] With the embodiment, the same effect as that of Embodiment 1 is obtainable and bi-directionally transportation of the substrate W is also obtainable along the transportation paths RA and RB in the substrate treating apparatus **1**.

[0171] The present invention is not limited to the foregoing examples, but may be modified as follows.

[0172] (1) In each of the embodiments mentioned above, the two processing blocks B**1** and B**2** are provided, for example, along the transportation path RA. Such two processing blocks are not limitative. That is, three or more processing blocks may be provided along the same transportation path. For instance, when three processing blocks are provided, the main transport mechanisms of the processing blocks each include four (3+1) arms. Moreover, in this case, the substrate transport mechanism holds a substrate W to pass through the processing block provided with the substrate transport mechanism using two (3−1) arms while transferring and receiving (replacing) the substrate W with the processing unit U as usual.

[0173] (2) In each of the embodiments and modification (1) mentioned above, the substrate W is subjected to either transfer or receipt via the mount tables PS1 to PS**3** and PS**5** to PS**7**. However, the substrate W may be subjected to either transfer or receipt using the arms of the main transport mechanism TB**1** and the main transport mechanism TB**2**.

[0174] (3) In each of the embodiments and the modifications mentioned above, the arm holders **63** of the main transport mechanisms TB**1** to TB**4** are each movable along the two transportation paths RA and RB. However, the arm holders **63** of the main transport mechanisms TB**1** to TB**4** may each be fixed in every direction along the two transportation paths RA and RB. For instance, when the substrate W may be delivered between the upstream or downstream block and the processing unit without moving the arm holder **63**, the arm holder **63** may be fixed in the direction along the two transportation paths RA and RB.

[0175] (4) In each of the embodiments and the modifications mentioned above, the main transport mechanisms TB1 to TB**4** each deliver the substrate W to and from the processing unit U while holding the substrate W to pass through the processing blocks B**1** to B**4**. At this time, the main transport mechanism TB**1** to TB**4** may each deliver (replace) the substrate W to and from the processing unit U below the arm **61***a* holding the substrate W. This achieves suppressed adhesion of dust on the held substrate W, the dust being possibly generated even when the arm, other than the arms holding the substrates W, delivers the substrate W to and from the processing unit U.

[0176] Moreover, as illustrated in FIG. **12**A, when the substrate W in the mount table PS**1** passing through the processing block B**1** is below the substrate W to be processed by the processing block B**1**, another transport mechanism may replace the substrate W. Moreover, the mount table PS**1** may have a construction that allows replacement of positions of the substrates W. Moreover, when the main transport mechanism BT**1** receives the substrate W from the mount table PS**1**, a timing for receiving the substrate W may be shifted so as for the substrate W passing through the processing block B**1** to be received with an arm above the arm for transferring and receiving the substrate W with the processing unit U.

[0177] The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification, as indicating the scope of the invention.

REFERENCE SIGNS LIST

[0178] **1** . . . substrate treating apparatus

[0179] **3** . . . indexer (ID section)

[0180] **5** . . . processor

[0181] **7** . . . interface (IF section)

[0182] **31** . . . main controller

[0183] **61***a* to **61***c* . . . arm
[0184] **63** . . . arm holder
[0185] **67** . . . first guide rail
[0186] **69** . . . second guide rail
[0187] RA, RB . . . transportation path
[0188] U . . . processing unit
[0189] TB**1** to TB**4** . . . main transport mechanism
[0190] PS**1** to PS**7** . . . mount table
[0191] PS**11***a* to PS**15***a* . . . mount table
[0192] PS**11***b* to PS**15***b* . . . mount table

What is claimed is:

1. A substrate treating apparatus for treating substrates, the substrate treating apparatus comprising:
n processing blocks arranged along an identical transportation path and performing an identical process to the substrates, the n being a natural number of 2 or larger,
an individual processing block of the n processing blocks including at least one processing unit performing a process set in advance to the substrates, and a single substrate transport mechanism having n+1 arms holding the substrates,
the substrate transport mechanism receiving n substrates of the substrates from an upstream processing block using n arms of the n+1 arms,
the substrate transport mechanism delivering one substrate of the received n substrates to and from the processing unit in the processing block using one arm of the n arms holding the one substrate of the n substrates to be subjected to a given process by the processing block and one arm of the n arms holding no substrate,
the substrate transport mechanism keeping holding n−1 substrate or substrates of the n substrates using remaining n−1 arm or arms of the n arms with which the n substrates are received while the processing unit processes the one substrate, and
the substrate transport mechanism transferring the n substrates to a downstream block using the one arm of the n arms holding the one substrate subjected to the given process by the processing block and the n−1 arm or arms holding the n−1 substrate or substrates.

2. The substrate treating apparatus according to claim **1**, wherein
the substrate transport mechanism further comprises an arm holding table holding the arms so as for the arms to be movable horizontally and to be movable along the transportation path, and the substrate transport mechanism receives the n substrates from the upstream processing block when the arm holding table is located adjacent to the upstream processing block on the transportation path.

3. The substrate treating apparatus according to claim **1**, wherein
the substrate transport mechanism further comprises an arm holding table holding the arms so as for the arms to be movable horizontally and to be movable along the transportation path, and the substrate transport mechanism transfers the n substrates to the downstream processing block when the arm holding table is located adjacent to the downstream processing block on the transportation path.

4. The substrate treating apparatus according to claim **2**, wherein
the substrate transport mechanism further comprises an arm holding table holding the arms so as for the arms to be movable horizontally and to be movable along the transportation path, and the substrate transport mechanism transfers the n substrates to the downstream processing block when the arm holding table is located adjacent to the downstream processing block on the transportation path.

5. The substrate treating apparatus according to claim **1**, wherein
the substrate transport mechanism receives the n substrates simultaneously from the upstream processing block.

6. The substrate treating apparatus according to claim **2**, wherein
the substrate transport mechanism receives the n substrates simultaneously from the upstream processing block.

7. The substrate treating apparatus according to claim **1**, wherein
the substrate transport mechanism transfers the n substrates simultaneously to the downstream processing block.

8. The substrate treating apparatus according to claim **3**, wherein
the substrate transport mechanism transfers the n substrates simultaneously to the downstream processing block.

9. The substrate treating apparatus according to claim **1**, further comprising:
a mount table between the adjacent upstream and downstream processing blocks for placing the substrate so as to perform transfer or receipt of the substrate to or from the processing block.

10. The substrate treating apparatus according to claim **2**, further comprising:
a mount table between the adjacent upstream and downstream processing blocks for placing the substrate so as to perform transfer or receipt of the substrate to or from the processing block.

11. The substrate treating apparatus according to claim **9**, wherein
the mount table allows placement of the n+1 substrates as well as either transfer or receipt of the substrates using the n+1 arms simultaneously.

12. The substrate treating apparatus according to claim **1**, wherein
the substrate transport mechanism delivers the substrate to and from the processing unit of the processing block below the arm holding the substrate.

13. The substrate treating apparatus according to claim **2**, wherein
the substrate transport mechanism delivers the substrate to and from the processing unit of the processing block below the arm holding the substrate.

14. The substrate treating apparatus according to claim **1**, wherein
the transportation path includes first and second transportation paths arranged in parallel, and
the processing block performs processing while transporting the substrate along the first transportation path in a first direction, and performs processing, different from the processing along the first transportation path, while transporting the substrate along the second transportation path in a second direction opposite to the first direction.

15. The substrate treating apparatus according to claim **2**, wherein

the transportation path includes first and second transportation paths arranged in parallel, and

the processing block performs processing while transporting the substrate along the first transportation path in a first direction, and performs processing, different from the processing along the first transportation path, while transporting the substrate along the second transportation path in a second direction opposite to the first direction.

16. The substrate treating apparatus according to claim **1**, wherein

the transportation path includes first and second transportation paths arranged in series, and

the processing block performs processing along the first transportation path while transporting the substrate along the first and second transportation paths in a first direction, and performs processing along the second transportation path, different from the processing along the first transportation path, while transporting the substrate along the first and second transportation paths in a second direction opposite to the first direction.

17. The substrate treating apparatus according to claim **2**, wherein

the transportation path includes first and second transportation paths arranged in series, and

the processing block performs processing along the first transportation path while transporting the substrate along the first and second transportation paths in a first direction, and performs processing along the second transportation path, different from the processing along the first transportation path, while transporting the substrate along the first and second transportation paths in a second direction opposite to the first direction.

18. A substrate transporting method for a substrate treating apparatus provided with n processing blocks arranged along an identical transportation path and performing an identical process to substrates, the n being a natural number of 2 or larger, an individual processing block of the n processing blocks having at least one processing unit performing a process set in advance to the substrates and a single substrate transport mechanism having arms holding the substrates,

the substrate transporting method, performed by the substrate transport mechanism, comprising;

receiving n substrates of the received substrates from an upstream processing block using n arms of the n+1 arms provided with the substrate transport mechanism;

delivering one substrate of the n substrates to and from the processing unit in the processing block using one arm of the n arms holding the one substrate of the n substrates to be subjected to a given process by the processing block and one arm of the n arms holding no substrate;

keeping holding n−1 substrate or substrates of the n substrates using remaining n−1 arm or arms of the n arms with which the n substrates are received while the processing unit processes the one substrate; and

transferring the n substrates to a downstream block using the one arm of the n arms holding the one substrate subjected to the given process by the processing block and the n−1 arms of the n arms holding the n−1 substrate or substrates.

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