

FIG.1

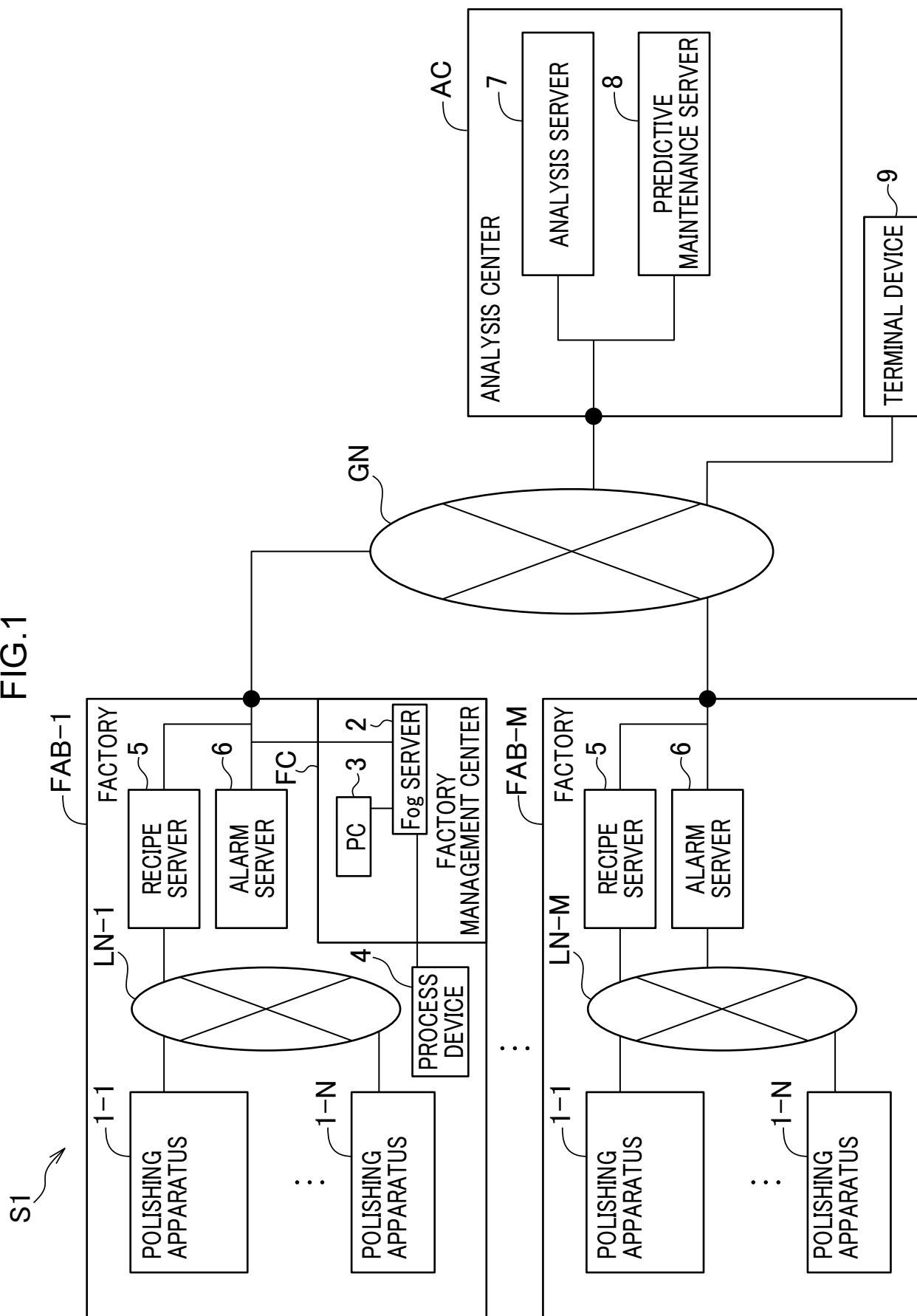


FIG.2

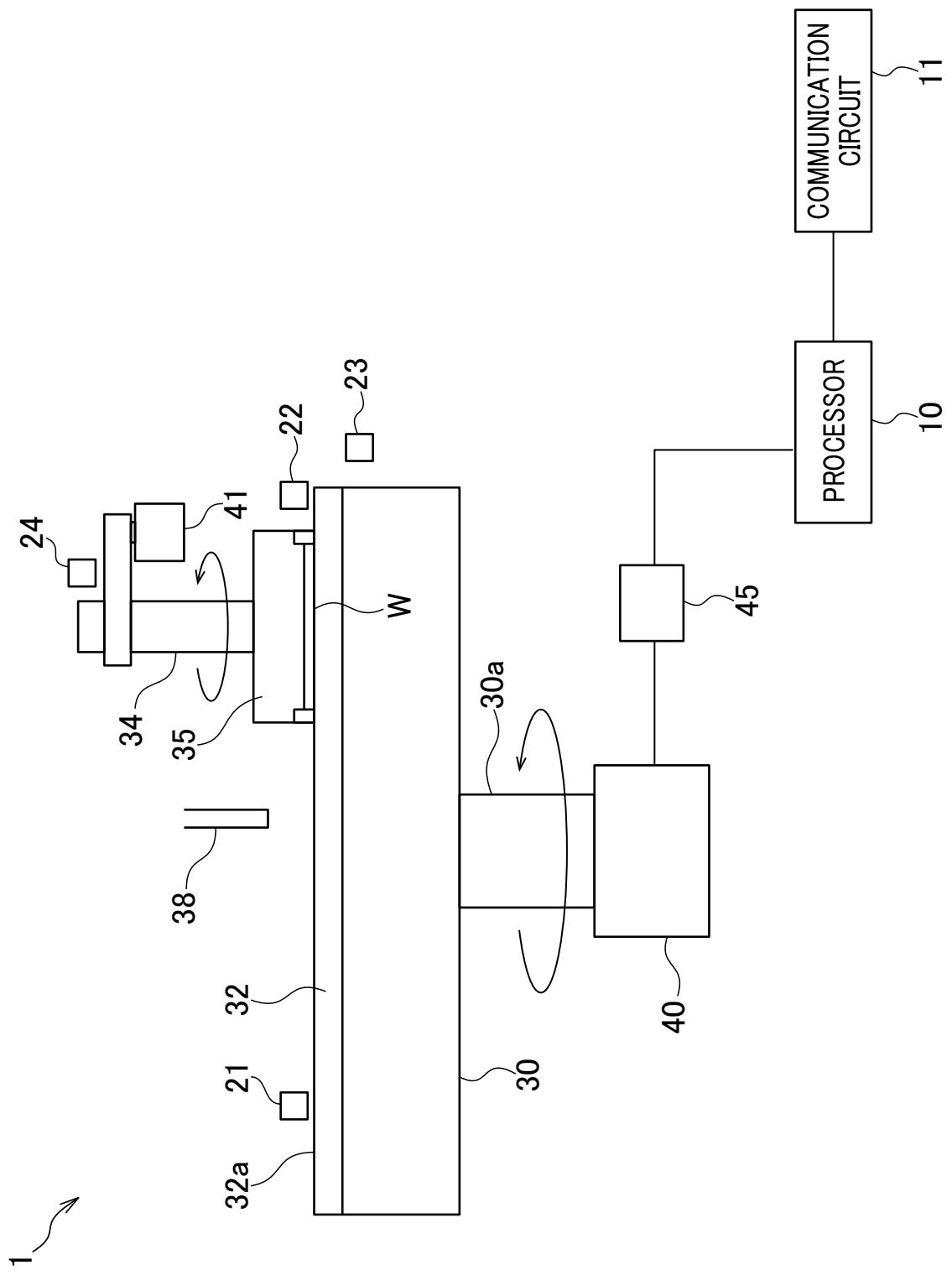


FIG.3

5 : RECIPE SERVER

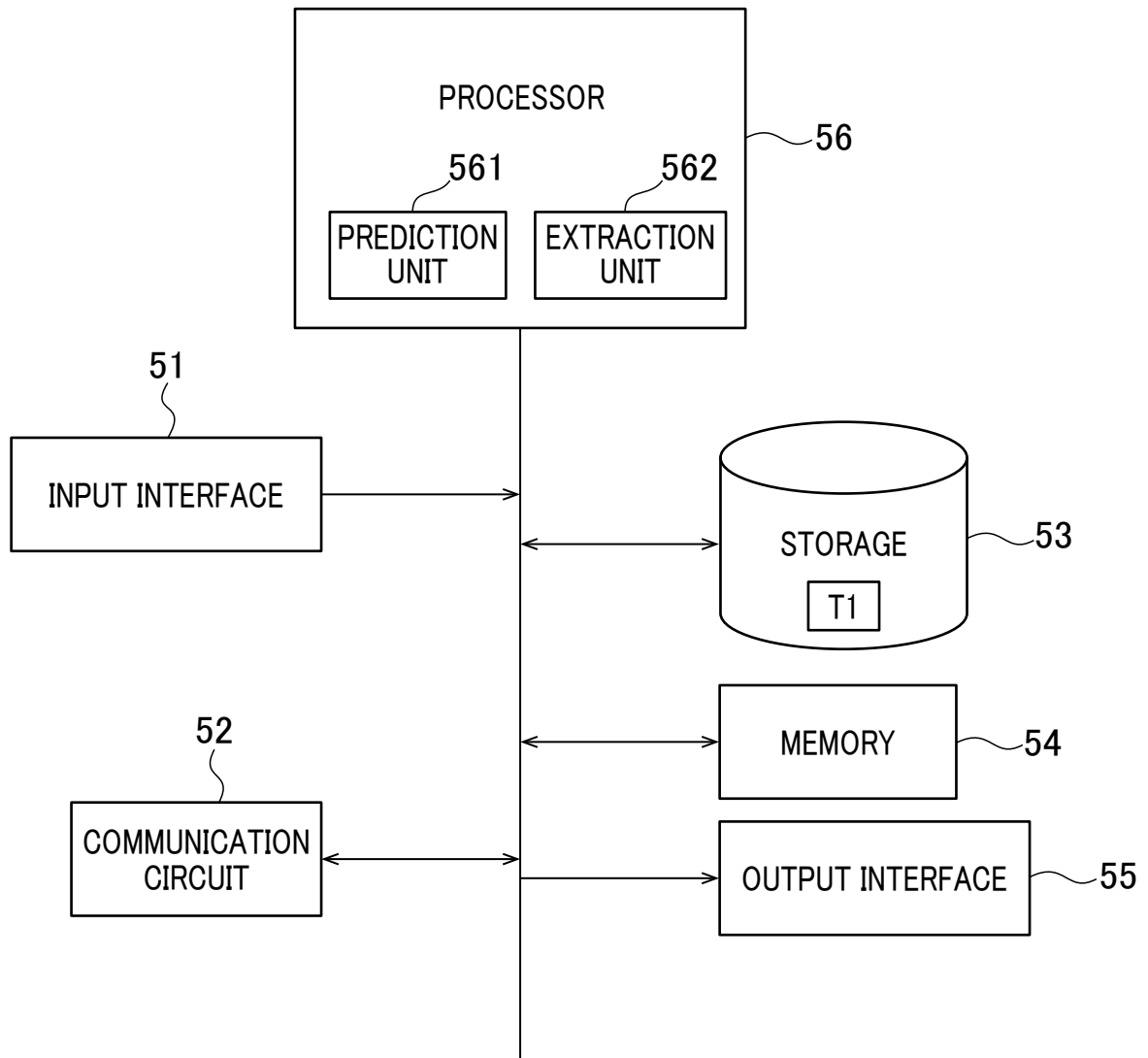


FIG.4

T1

LOT OF WAFER	TIME-SERIES DATA OF MOTOR CURRENT	TIME-SERIES DATA OF FLOW RATE OF WATER/SLURRY	TIME-SERIES DATA OF POLISHING PRESSURE	TIME-SERIES DATA OF ROTATION SPEED OF POLISHING TABLE	TIME-SERIES DATA OF ROTATION SPEED OF TOP RING	...
L00001	MR0001	FR0001	PR0001	TR0001	RR0001	...
L00001	MR0002	FR0002	PR0002	TR0002	RR0002	...
L00002	MR0003	FR0003	PR0003	TR0003	RR0003	...
...	...	...	...	...	...	...

FIG.5

6 : ALARM SERVER

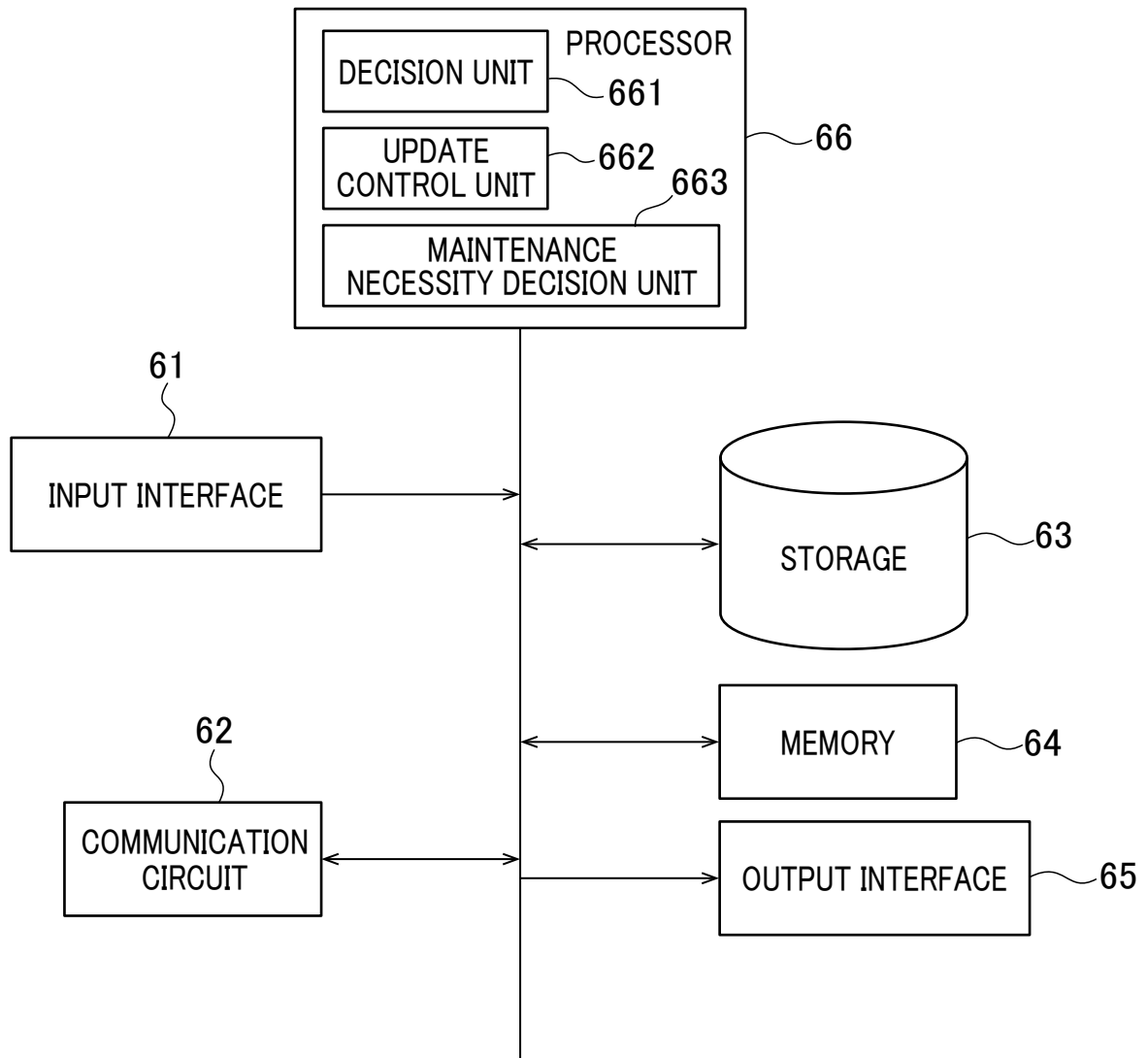


FIG.6

7 : ANALYSIS SERVER

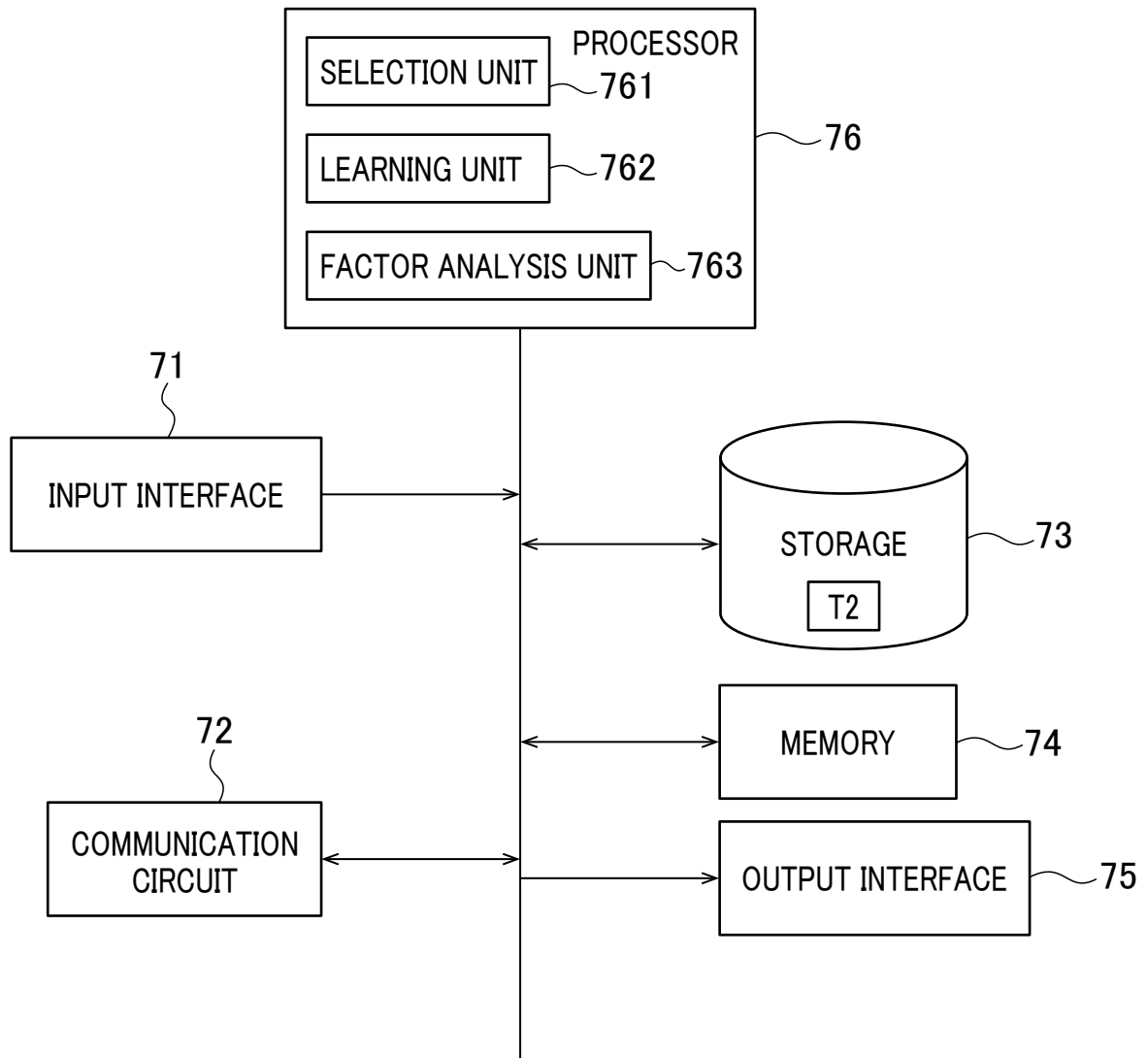


FIG.7

T2

RECORD ID	PRESENCE OR ABSENCE OF ABNORMALITY IN MOTOR CURRENT	PRESENCE OR ABSENCE OF ABNORMALITY IN FLOW RATE OF WATER/ SLURRY	PRESENCE OR ABSENCE OF ABNORMALITY IN POLISHING PRESSURE	PRESENCE OR ABSENCE OF ABNORMALITY IN ROTATION SPEED OF POLISHING TABLE	PRESENCE OR ABSENCE OF ABNORMALITY IN ROTATION SPEED OF TOP RING	FACTOR OF ABNORMALITY	SOLUTION TO ABNORMALITY
Y00001	ABSENCE	ABSENCE	PRESENCE	ABSENCE	ABSENCE	PAD	DRESSING BY REPLACEMENT OF PAD
Y00002	...	...	...	...	...	RETAINER RING	REPLACEMENT OF RETAINER RING
Y00003	...	...	...	...	...	SLURRY	ADJUSTMENT OF SLURRY CONDITION
Y00004	...	...	...	...	...	MEMBRANE	REPLACEMENT OF MEMBRANE
Y00005	...	...	...	...	...	WAFER	CHECKING OF ABNORMALITY IN WAFER FILM
...	...	...	...	...	...	...	

FIG.8

8 : PREDICTIVE MAINTENANCE SERVER

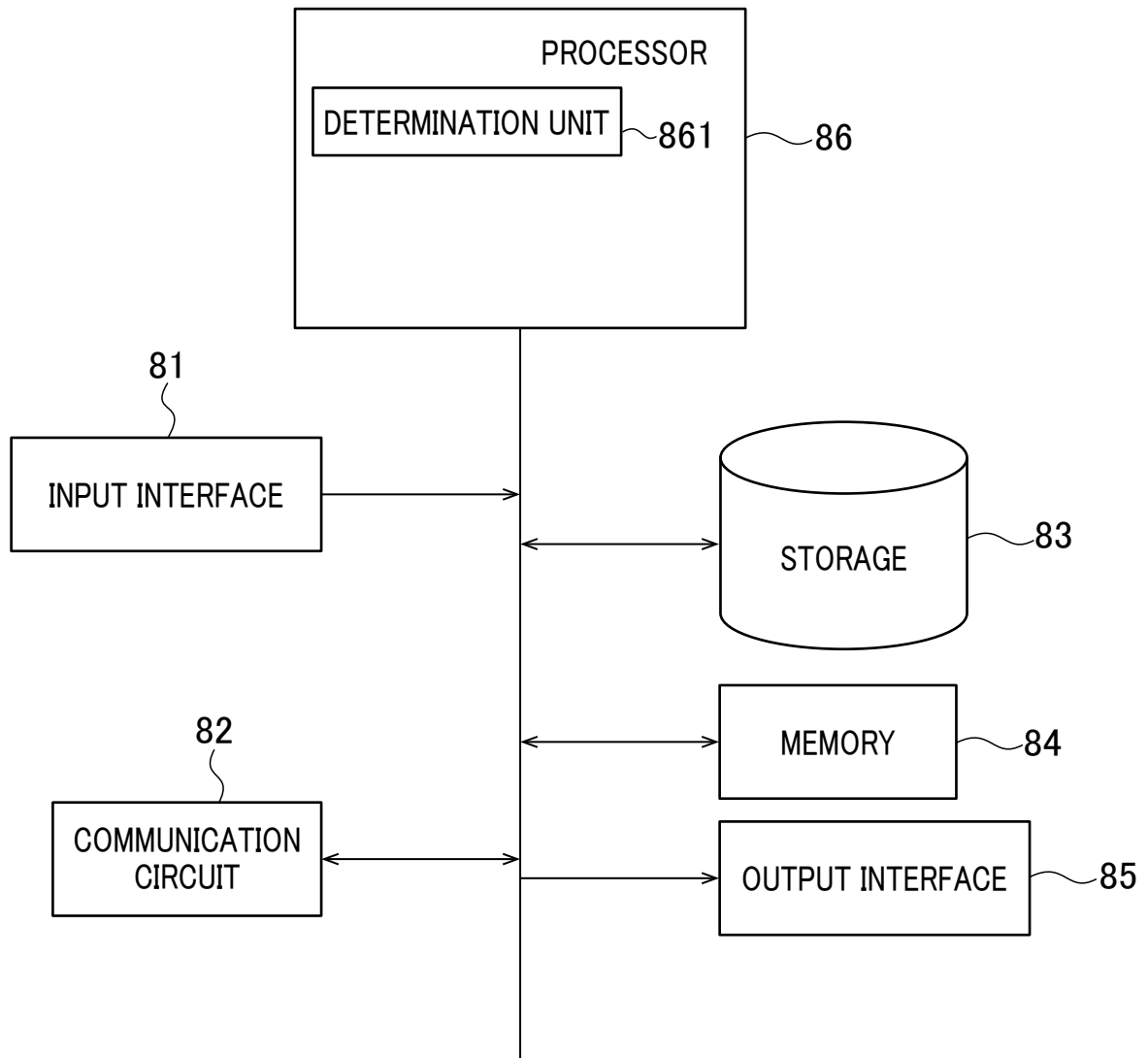


FIG.9

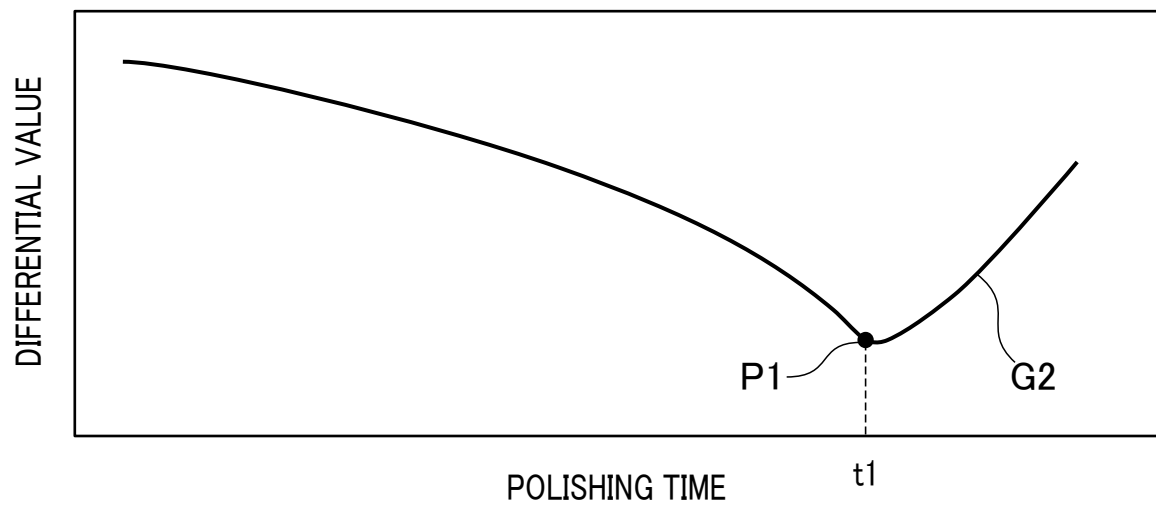
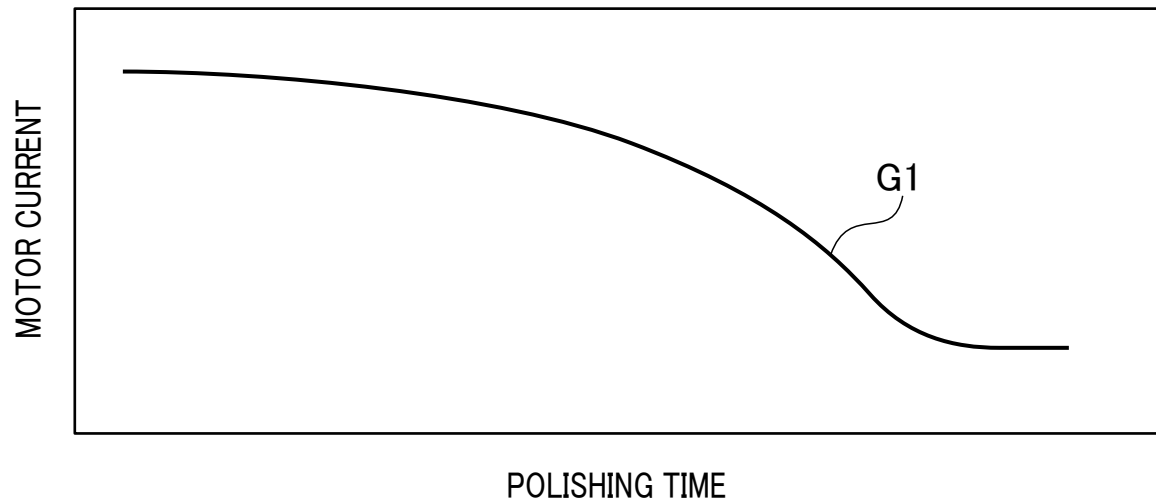


FIG.10

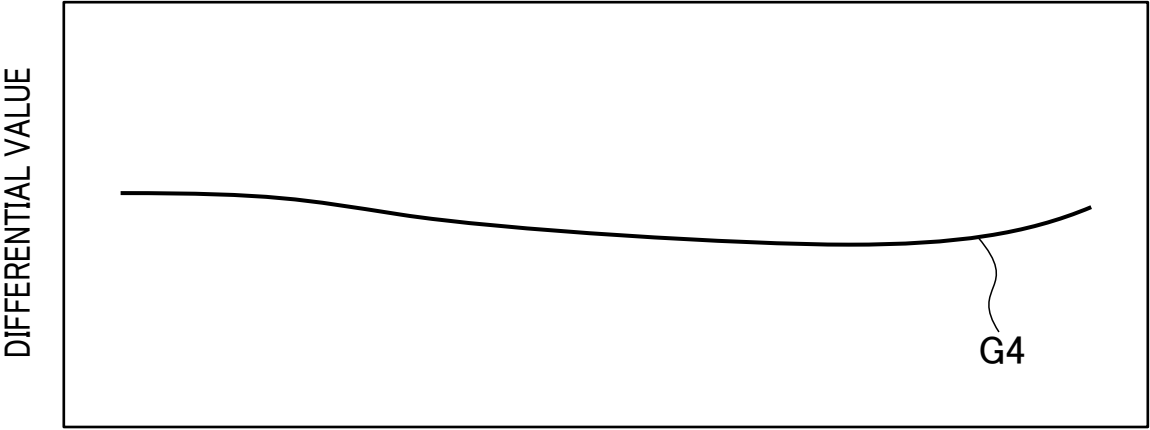
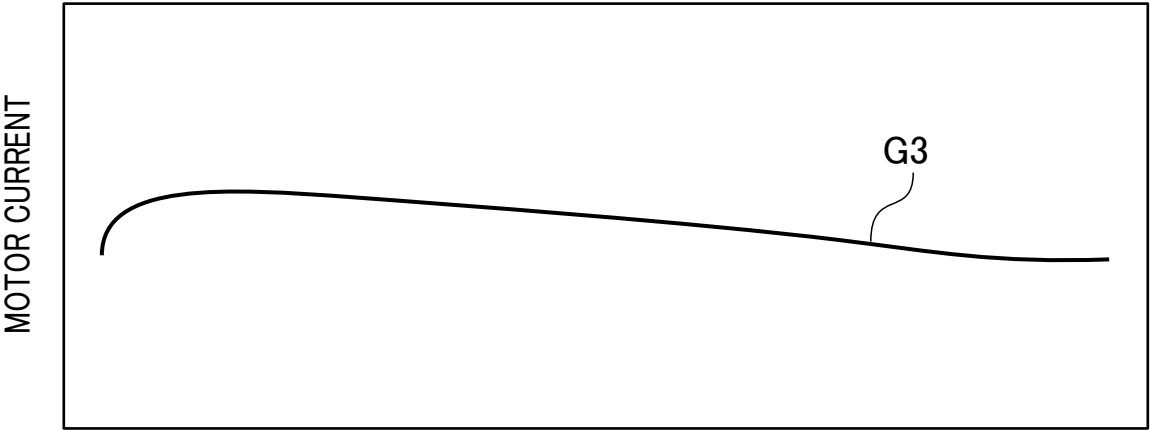


FIG.11

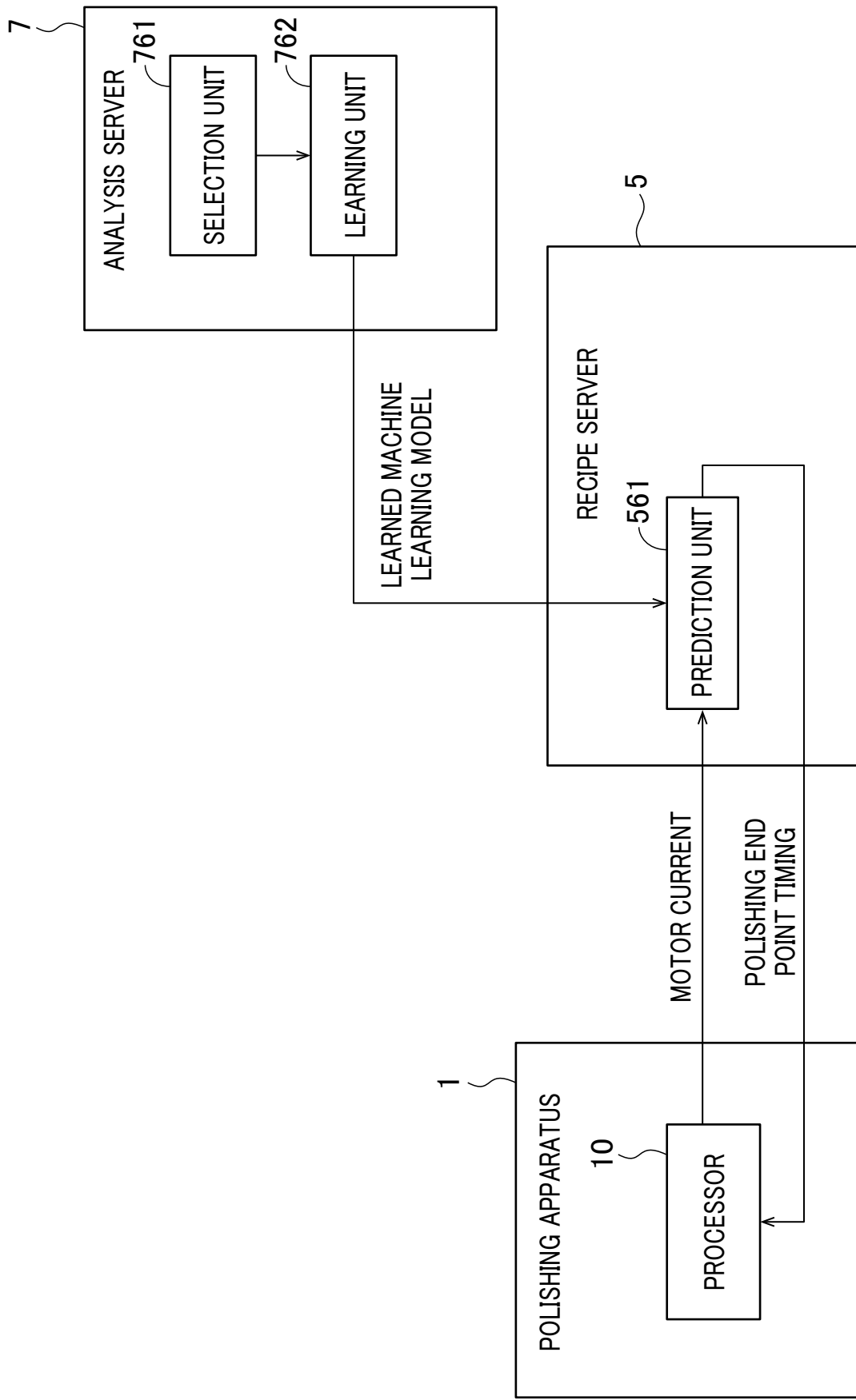


FIG.12

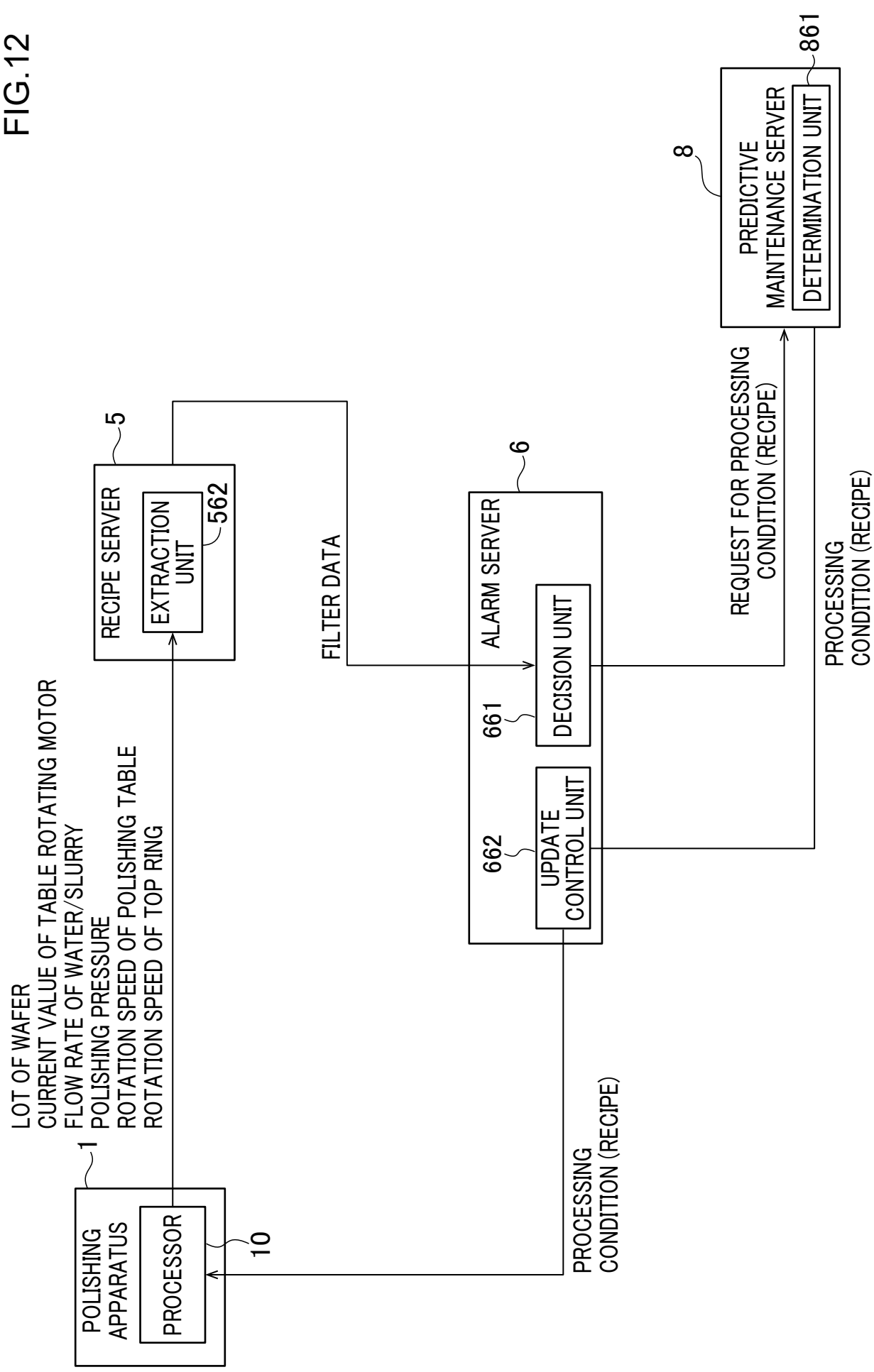


FIG.13

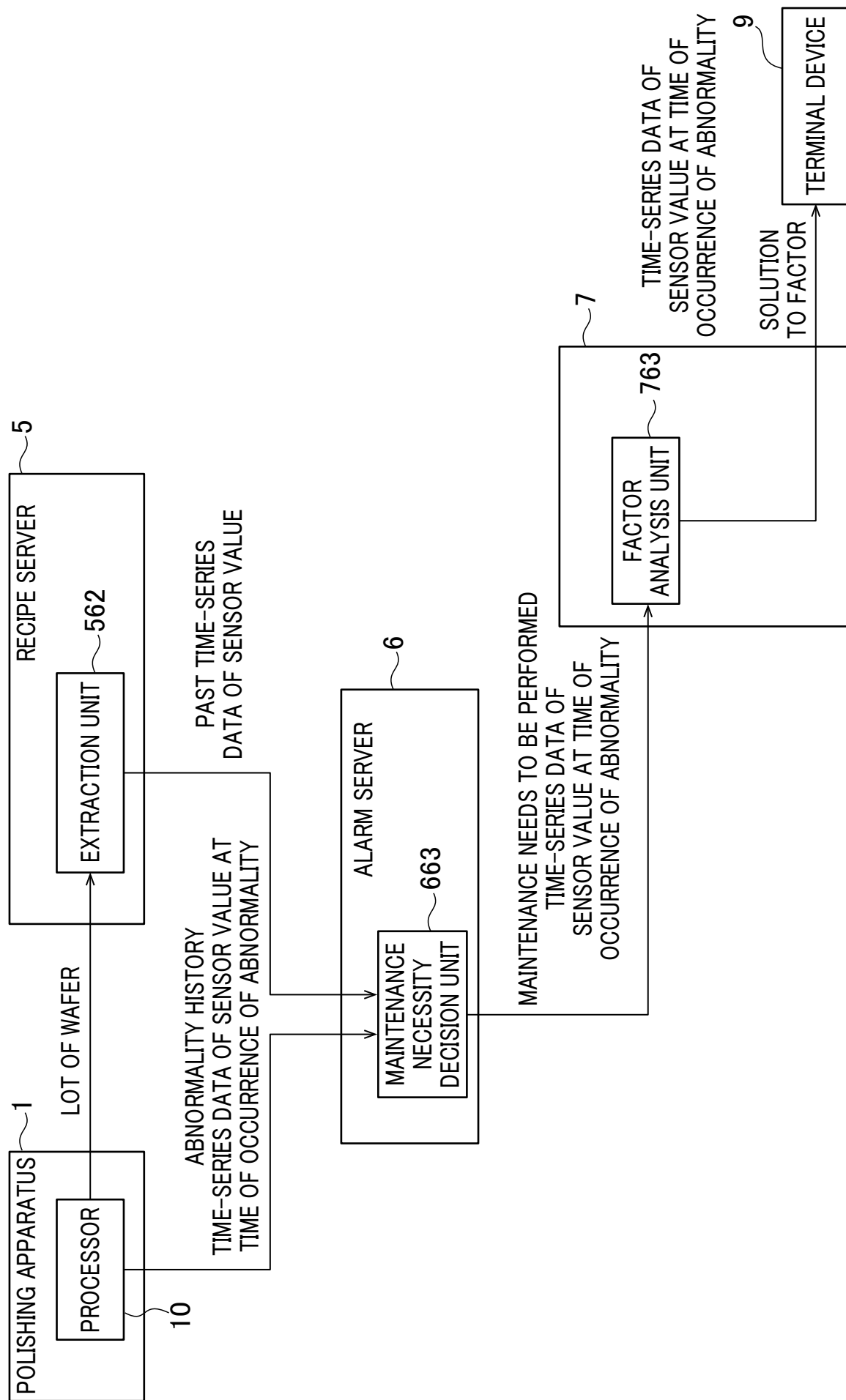


FIG.14

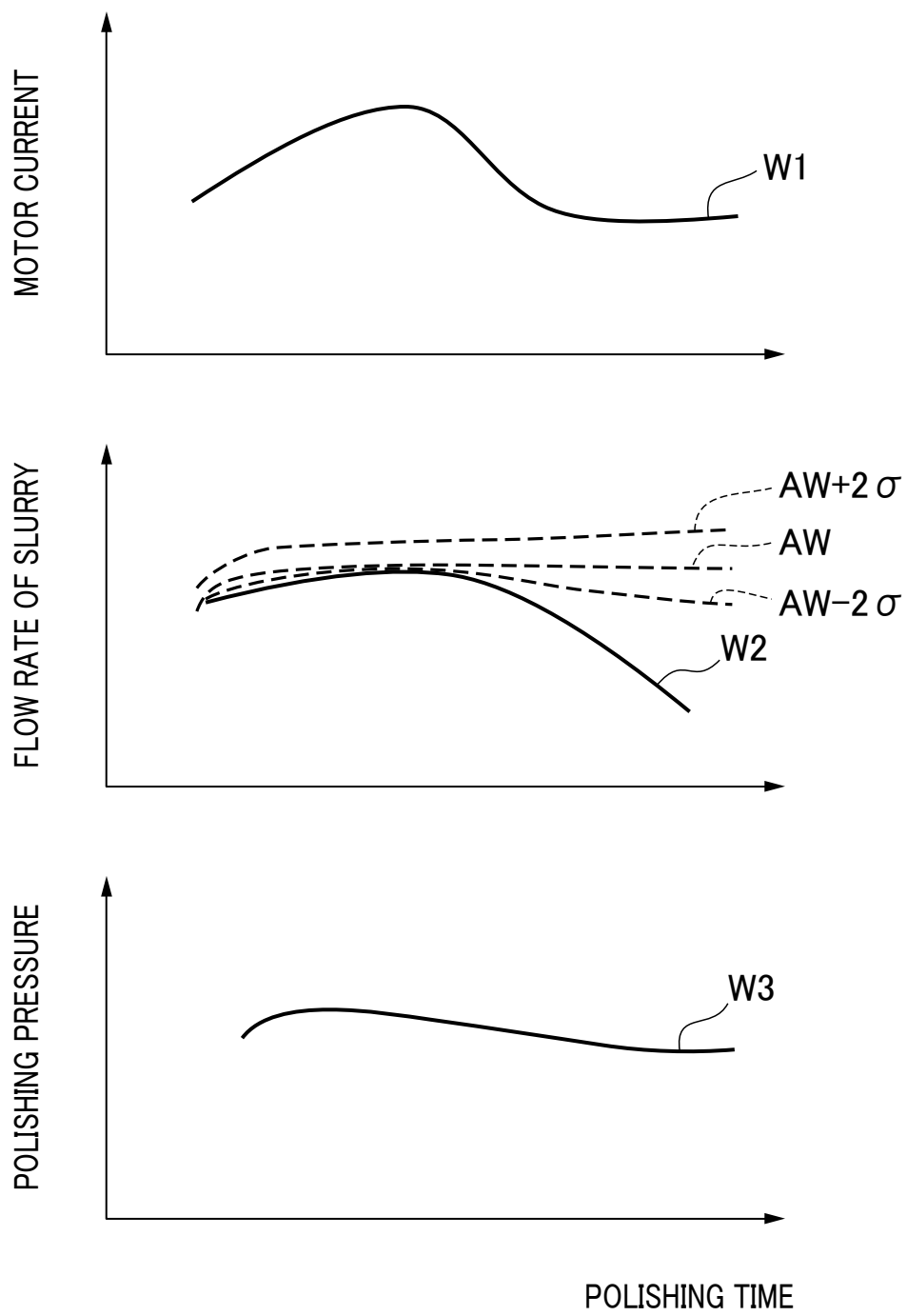


FIG.15

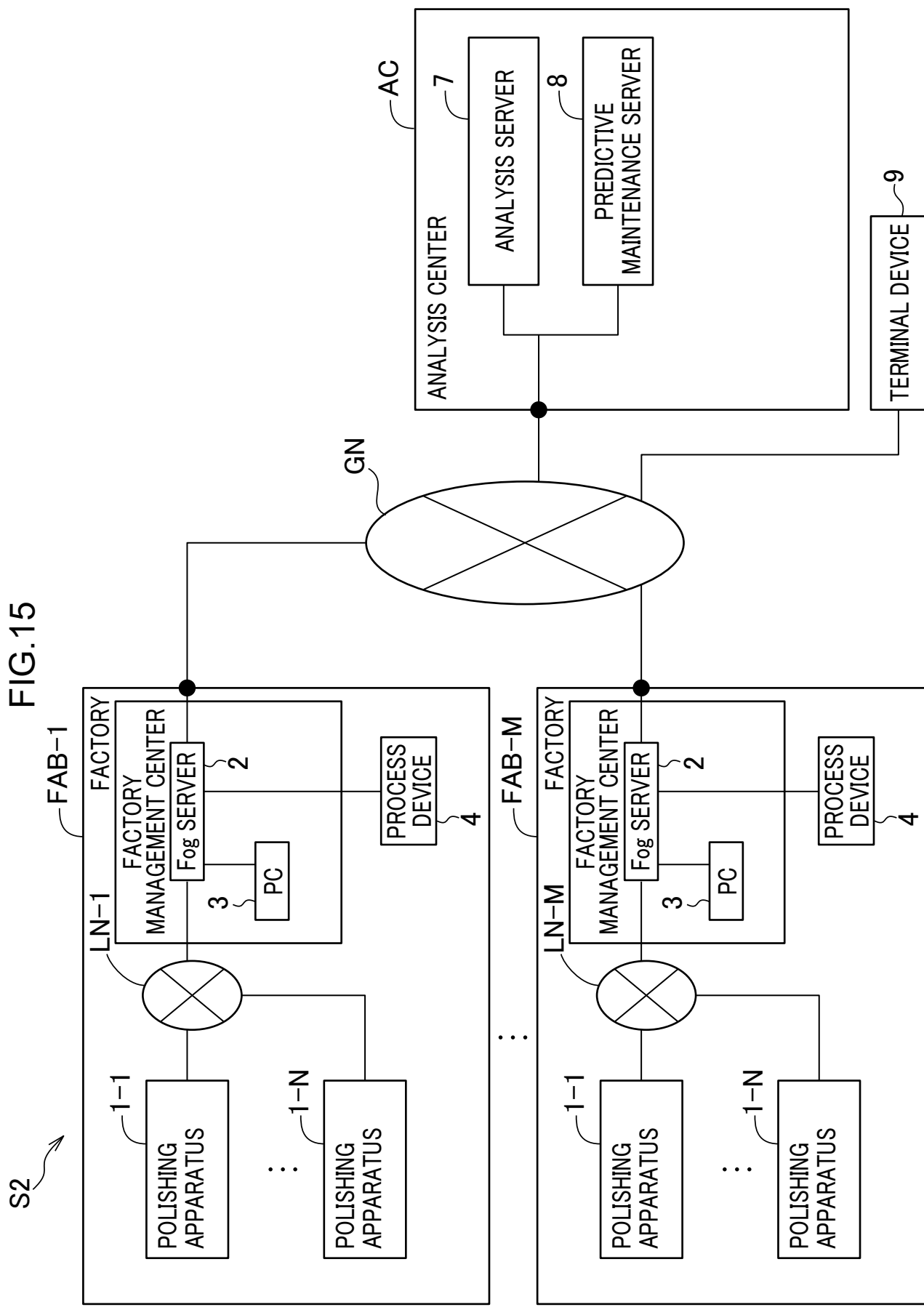


FIG.16

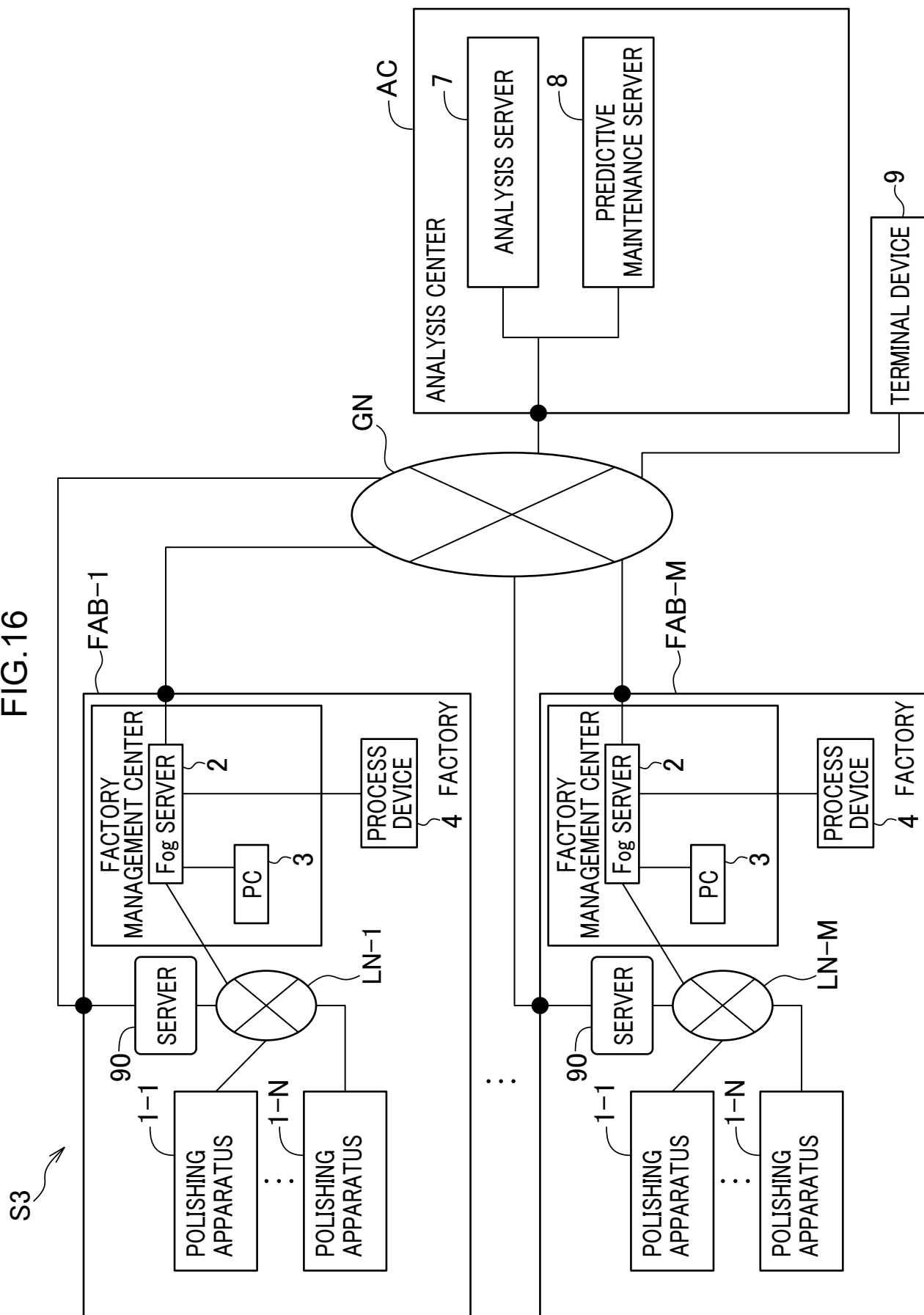


FIG.17

OPERATION UNIT	FUNCTIONS	MECHANISMS	IoT CONFIGURATIONS	ADVANTAGES AND REASONS
POLISHING APPARATUS (EDGE)	1) END POINT 2) POLISHING UNIFORMIZATION · TEMPERATURE CONTROL · PRESSING CONTROL · ROTATION CONTROL · in situ ANALYSIS/MEASUREMENT 3) UPDATE OF RECIPE HIGH-SPEED PROCESSING/ NO DATA STORAGE	1) TORQUE TT, TR, TROT, SOPM, EDDY 2) PAD TEMPERATURE, MEMBRANE PRESSING DISTRIBUTION, ROTATION SPEED, FILM THICKNESS DISTRIBUTION MEASUREMENT/DECISION 3) HIGH-SPEED DECISION/ APPLICATION OF UPDATE CONDITION	·FOR EACH APPARATUS	· PROCESSING AND PREDICTION DETERMINATION THAT ARE REQUIRED TO BE EXECUTED AT HIGH SPEED CAN BE EXECUTED ACCORDING TO ENVIRONMENTAL CHANGE · BY UPDATING RECIPE AND DETERMINATION MODEL ACCORDING TO CHANGE IN STATE
FACORY MANAGEMENT CENTER /Fog SERVER	1) WARNING /ABNORMALITY MANAGEMENT 2) OPERATION HISTORY MANAGEMENT 3) CONSUMABLES MANAGEMENT 4) OPERATION STATE MANAGEMENT 5) RECIPE MANAGEMENT 6) EMERGENCY AVOIDANCE OPERATION 7) REPLACEMENT /MAINTENANCE NOTIFICATION MAIN DATA ACCUMULATION AND VISUALIZATION SIMPLE RELEVANCE /TENDENCY ANALYSIS AND UPDATE	1) PROCESS/CONVEYANCE 2) POLISHING TIME 3) USAGE TIME AND EVENT TYPE/ NUMBER OF TIMES 4) POLISHING CONDITION VARIATION HISTORY 5) RECIPE UPDATE AND EVENT TYPE/ NUMBER OF TIMES 6) EVENT TYPE/NUMBER OF TIMES AND PREVIOUS AND SUBSEQUENT CONDITIONS 7) RECOMMENDATION AND WARNING NOTIFICATION	·MANAGEMENT OF DATA OF MULTIPLE IN-FACORY DEVICES	· IT IS POSSIBLE TO CENTRALLY MANAGE STATES OF MANY IN-FACORY DEVICES · NEXT STAGE IS HANDLED AND UPDATED FROM SHORT-TERM TENDENCY ANALYSIS BETWEEN DEVICES
ANALYSIS CENTER/ ANALYSIS SERVER, PREDICTIVE MAINTENANCE SERVER, Fog SERVER, OR CLOUD	1) ANALYSIS · OPTIMIZATION OF POLISHING CONDITION · PREDICTION/MAINTENANCE OF CONSUMABLES 2) REFLECTION OF ABOVE DESCRIPTION · UPDATE OF RECIPE · UPDATE OF REPLACEMENT TIME LONG-TERM TENDENCY ANALYSIS AND UPDATE, SUCH AS ANALYSIS OF DATA OF MANY DEVICES, RECIPE IMPROVEMENT, AND THE LIKE (PARAMETER CORRELATION ANALYSIS/ AUTOMATIC PROCESS DECISION, AND THE LIKE)	1) CLASSIFICATION OF LARGE AMOUNT OF DATA, CORRELATION ANALYSIS, EFFECT ANALYSIS AND IMPROVEMENT CONDITION/ FUNCTION/DETERMINATION 2) UPDATE TO IMPROVED RECIPE, UPDATE OF DETERMINATION MODEL FOR CONSUMABLES, AND THE LIKE	·ACCUMULATION AND USE OF DATA FROM MANY FACTORIES	· DATA FROM MANY FACTORIES/ DEVICES IS USED TO PERFORM TENDENCY ANALYSIS AND EFFECT ANALYSIS AND CREATE IMPROVED MODEL AND DETERMINATION CRITERION, AND UPDATED VERSION RECIPE, MODEL, AND THE LIKE ARE TRANSMITTED TO FACTORY Fog AND UPDATED · RECIPE, MODEL AND THE LIKE TO BE USED BY FACTORY Fog CAN BE UPDATED

FIG.18

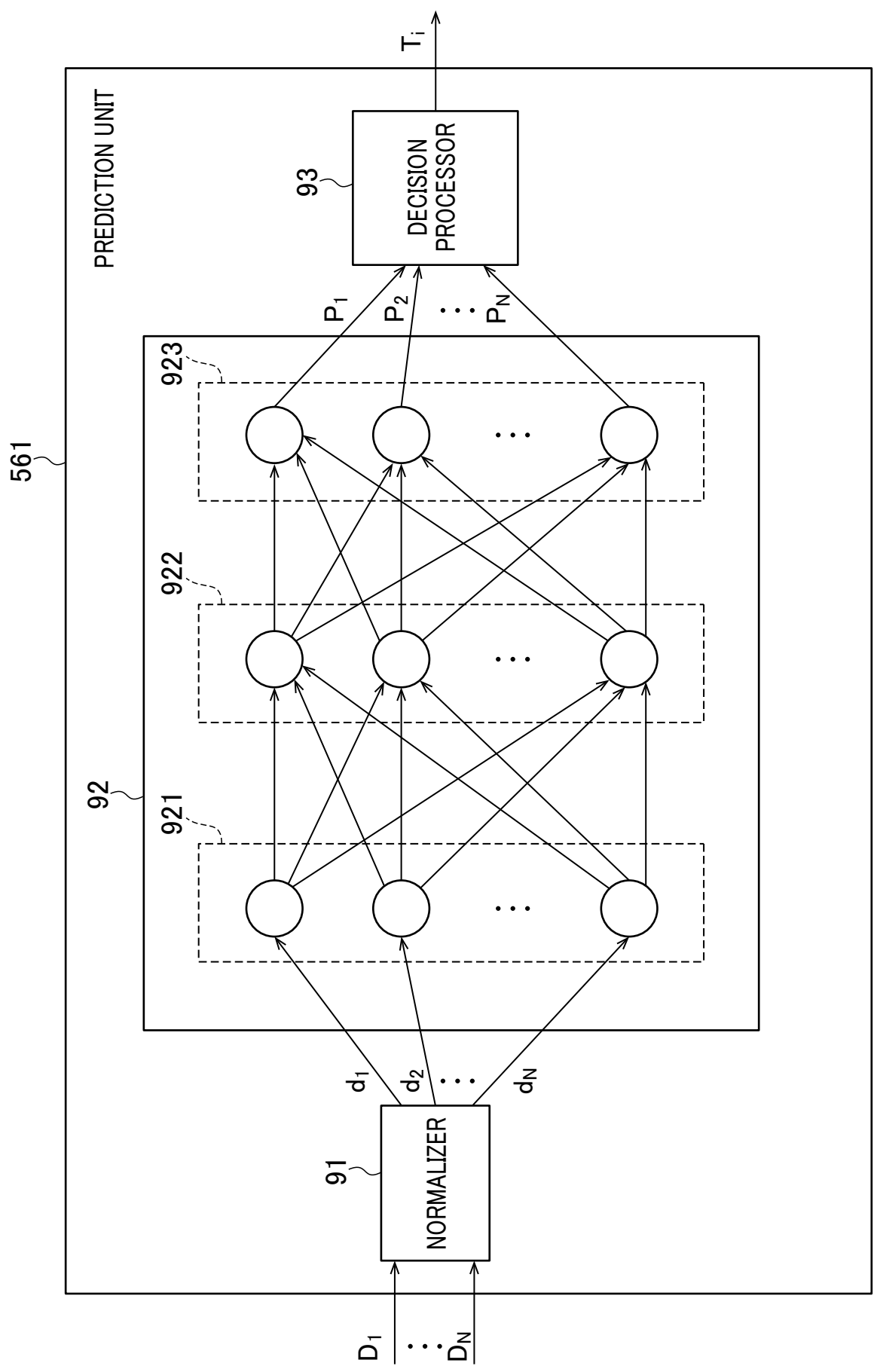


FIG.19

