

FIG. 1

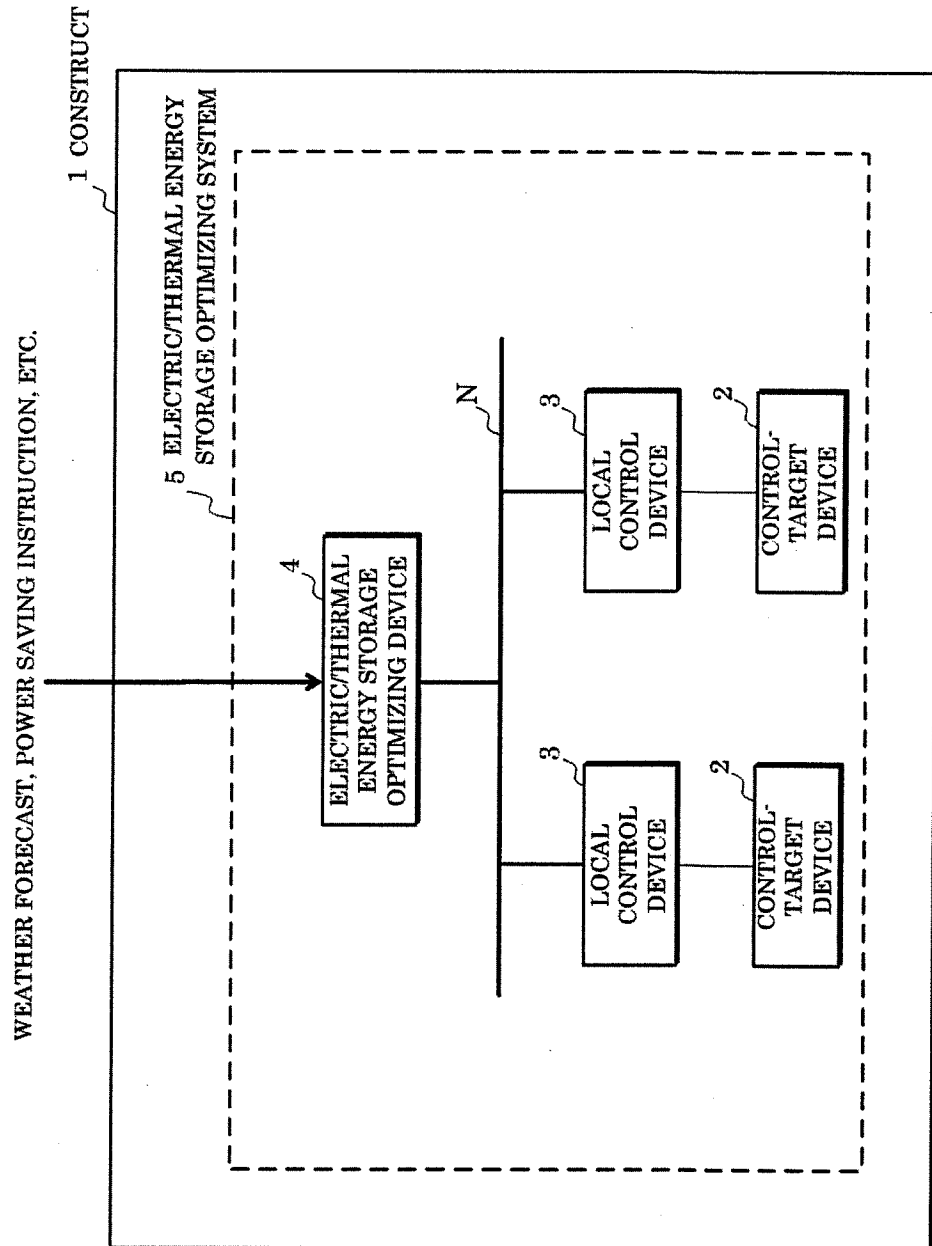


FIG. 2

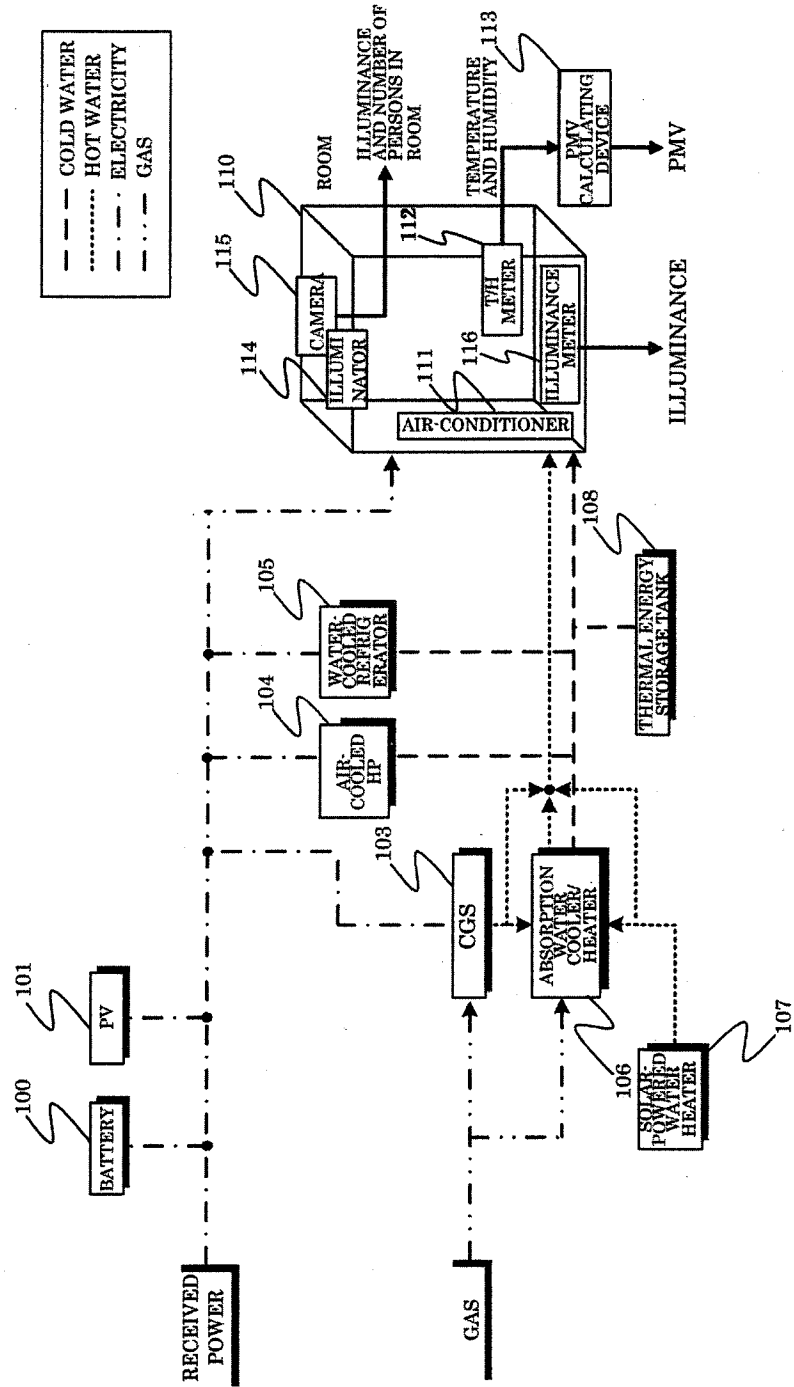


FIG. 3

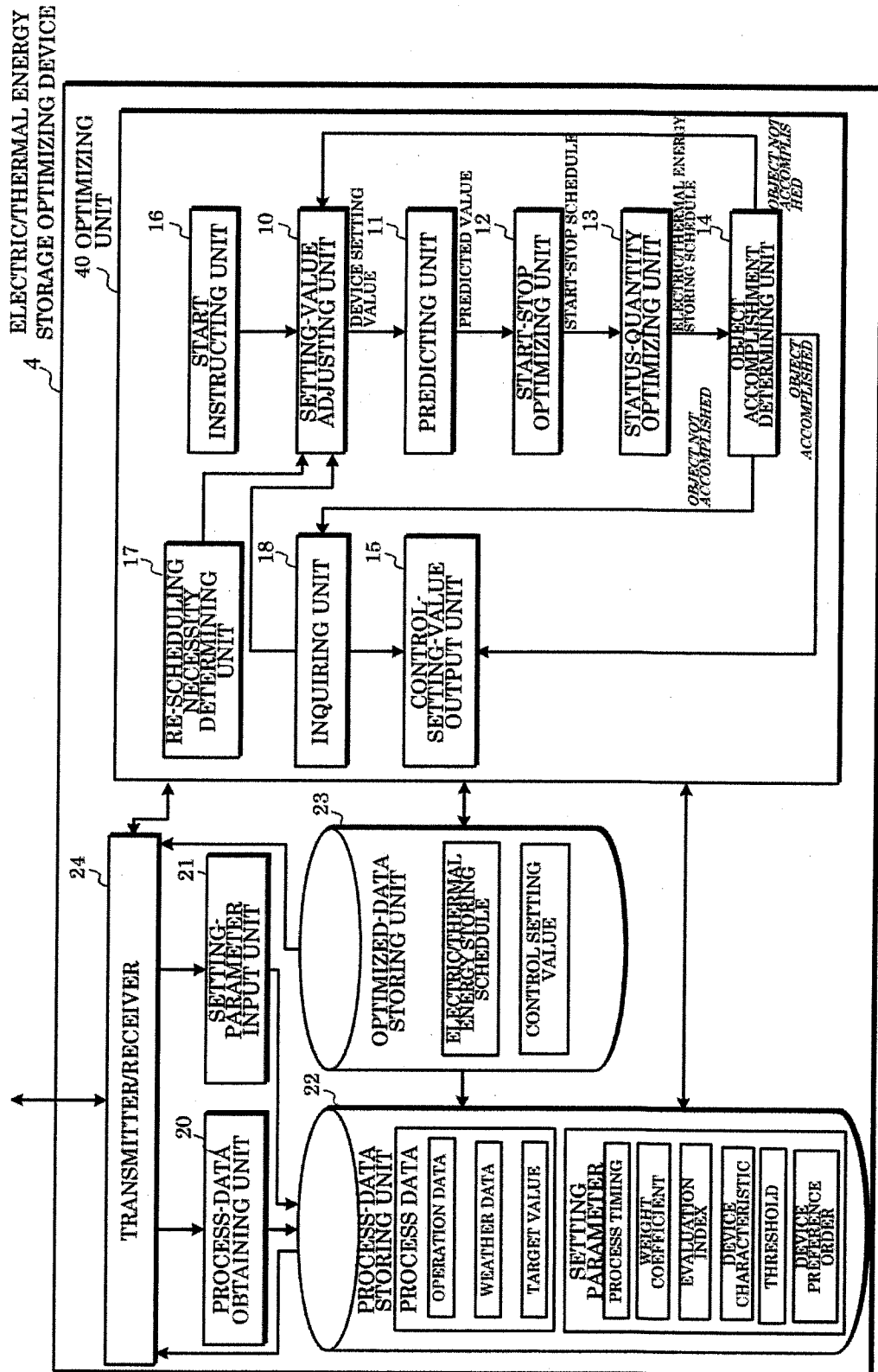
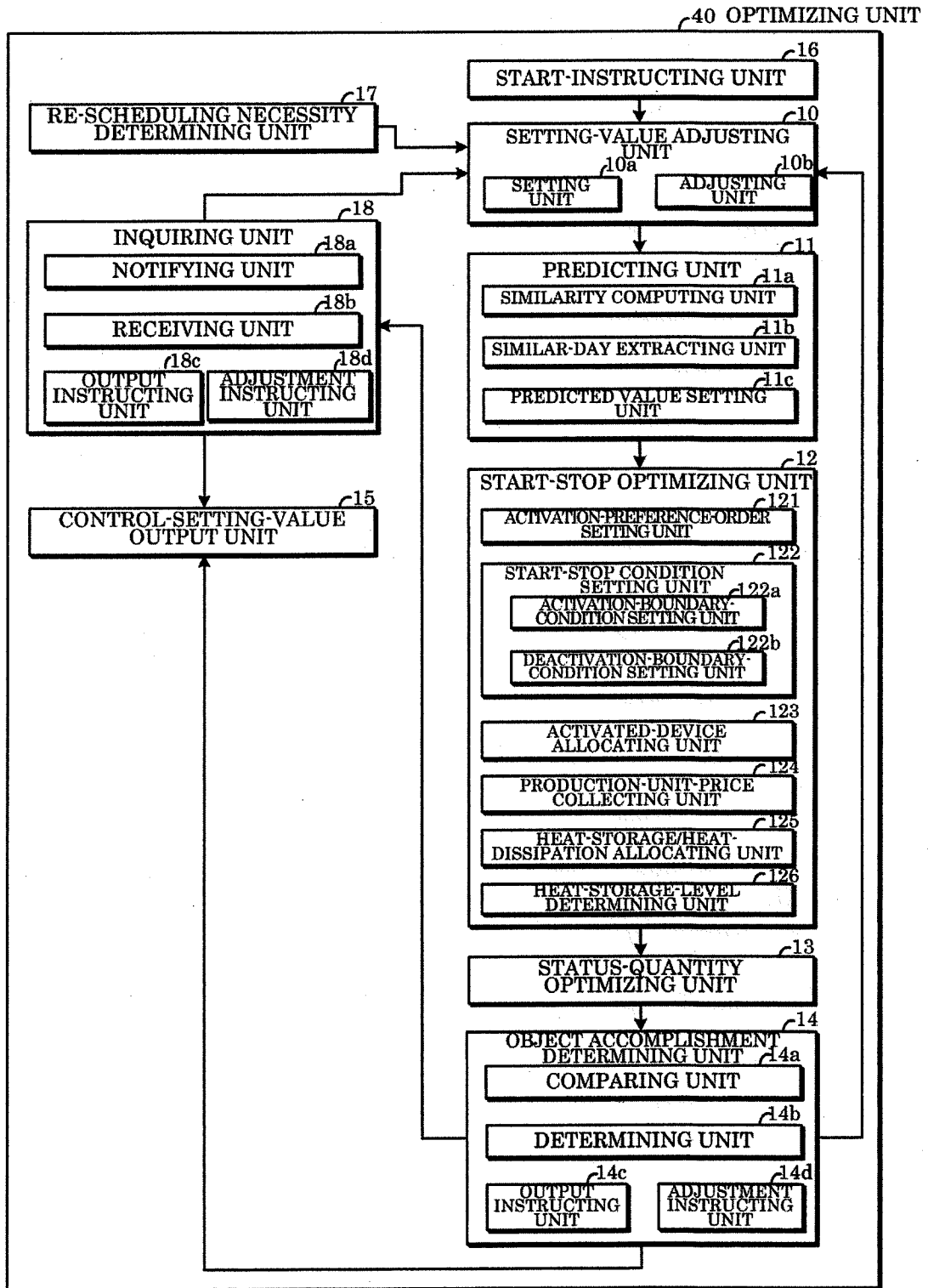


FIG. 4



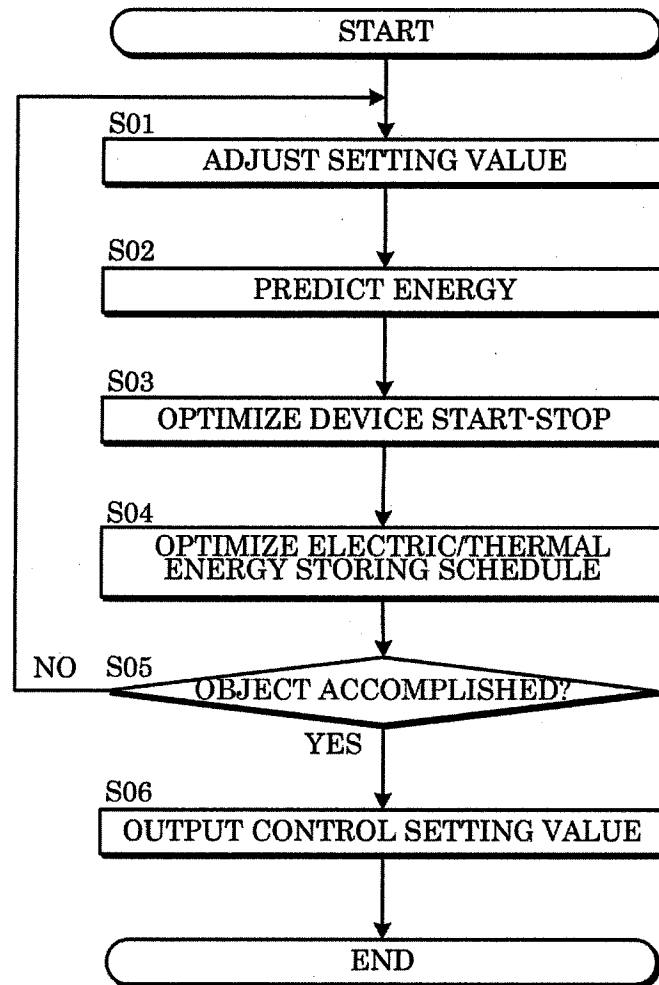
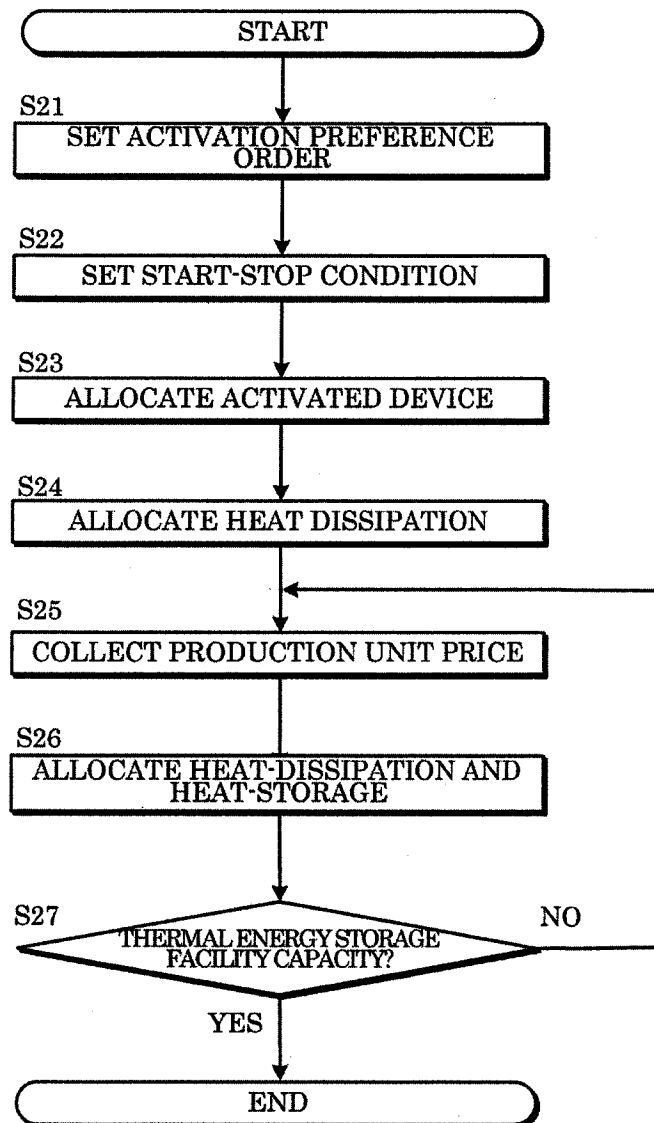
*FIG. 5*

FIG. 6

| DAY NUMBER | DAY OF WEEK | WEATHER | MAXIMUM TEMPERATURE (°C)<br>TM <sub>i</sub> | LOWEST TEMPERATURE (°C)<br>TL <sub>i</sub> | RELATIVE HUMIDITY(%RH)<br>RH <sub>i</sub> | PMV <sub>i</sub> (OR MEASURED VALUE) | ILLUMINATION (OR MEASURED VALUE)<br>L <sub>i</sub> |
|------------|-------------|---------|---------------------------------------------|--------------------------------------------|-------------------------------------------|--------------------------------------|----------------------------------------------------|
| 1          | MONDAY      | SUNNY   | 33.0                                        | 24.0                                       | 56                                        | 0.2                                  | 500                                                |
| 2          | TUESDAY     | SUNNY   | 33.0                                        | 23.0                                       | 56                                        | 0.2                                  | 500                                                |
| 3          | WEDNESDAY   | CLOUDY  | 29.0                                        | 20.0                                       | 50                                        | 0.3                                  | 500                                                |
| 4          | THURSDAY    | SUNNY   | 33.0                                        | 25.6                                       | 55                                        | 0.1                                  | 550                                                |
| 5          | FRIDAY      | CLOUDY  | 26.0                                        | 22.0                                       | 59                                        | 0.4                                  | 550                                                |
| 6          | SATURDAY    | SUNNY   | 30.0                                        | 24.0                                       | 59                                        | 0.5                                  | 600                                                |
| 7          | SUNDAY      | CLOUDY  | 30.0                                        | 25.0                                       | 72                                        | 0.5                                  | 600                                                |
| 8          | MONDAY      | SUNNY   | 27.5                                        | 23.0                                       | 56                                        | 0.5                                  | 550                                                |
| 9          | TUESDAY     | RAINY   | 27.0                                        | 22.8                                       | 98                                        | 0.2                                  | 500                                                |
| 10         | WEDNESDAY   | SUNNY   | 26.5                                        | 20.7                                       | 55                                        | 0.3                                  | 550                                                |
| 11         | THURSDAY    | CLOUDY  | 26.0                                        | 28.6                                       | 71                                        | 0.0                                  | 600                                                |
| 12         | FRIDAY      | SUNNY   | 31.0                                        | 26.0                                       | 56                                        | 0.0                                  | 600                                                |
| 13         | SATURDAY    | RAINY   | 28.0                                        | 20.0                                       | 95                                        | 0.1                                  | 650                                                |
| :          | :           |         | :                                           | :                                          | :                                         | :                                    | :                                                  |
| n-1        | THURSDAY    | SUNNY   | 27.5                                        | 18.8                                       | 47                                        | 0.2                                  | 650                                                |
| n          | FRIDAY      | RAINY   | 27.0                                        | 17.7                                       | 87                                        | 0.2                                  | 700                                                |

*FIG. 7*

*FIG. 8*COLD WATER PRODUCTION UNIT  
PRICE TABLE

|                                                 |                                                                      | FIRST<br>CASE | SECOND<br>CASE | THIRD<br>CASE                        | FOURTH<br>CASE                         | FIFTH<br>CASE | SIXTH<br>CASE |
|-------------------------------------------------|----------------------------------------------------------------------|---------------|----------------|--------------------------------------|----------------------------------------|---------------|---------------|
| CONTROL-TARGET<br>DEVICE                        | CGS                                                                  | ×             | ×              | ○<br>POWER<br>GENERATION<br>VARIABLE | ○<br>POWER<br>GENERATION<br>INVARIABLE | ×             | ×             |
|                                                 | WATER-COOLED<br>REFRIGERATOR                                         | ○             | ×              | ×                                    | ×                                      | ×             | ×             |
|                                                 | AIR-COOLED<br>HP                                                     | ×             | ○              | ×                                    | ×                                      | ×             | ×             |
|                                                 | SOLAR-POWERED<br>WATER HEATER                                        | ×             | ×              | ×                                    | ×                                      | ○             | ×             |
|                                                 | ABSORPTION WATER<br>COOLER/HEATER<br>(USE GAS)                       | ×             | ×              | ×                                    | ×                                      | ×             | ○             |
|                                                 | ABSORPTION WATER<br>COOLER/HEATER<br>(LOADED WITH<br>EXHAUSTED HEAT) | ×             | ×              | ○                                    | ○                                      | ○             | ×             |
| COLD HEAT PRODUCTION<br>UNIT PRICE<br>[YEN/KWH] |                                                                      | 2.27          | 4.44           | 14.44                                | 2.89                                   | 0.00          | 8.00          |

*FIG. 9*

HOT HEAT PRODUCTION UNIT PRICE

|                                                |                                                | FIRST<br>CASE | SECOND<br>CASE                       | THIRD<br>CASE                          | FOURTH<br>CASE | FIFTH<br>CASE |
|------------------------------------------------|------------------------------------------------|---------------|--------------------------------------|----------------------------------------|----------------|---------------|
| CONTROL-TARGET<br>DEVICE                       | CGS                                            | ×             | ○<br>POWER<br>GENERATION<br>VARIABLE | ○<br>POWER<br>GENERATION<br>INVARIABLE | ×              | ×             |
|                                                | AIR-COOLED<br>HP                               | ○             | ×                                    | ×                                      | ×              | ×             |
|                                                | SOLAR-<br>POWERED<br>WATER HEATER              | ×             | ×                                    | ×                                      | ○              | ×             |
|                                                | ABSORPTION WATER<br>COOLER/HEATER<br>(USE GAS) | ×             | ×                                    | ×                                      | ×              | ○             |
| HOT HEAT PRODUCTION<br>UNIT PRICE<br>[YEN/KWH] |                                                | 3.93          | 11.18                                | 2.24                                   | 0              | 9.00          |

FIG. 10

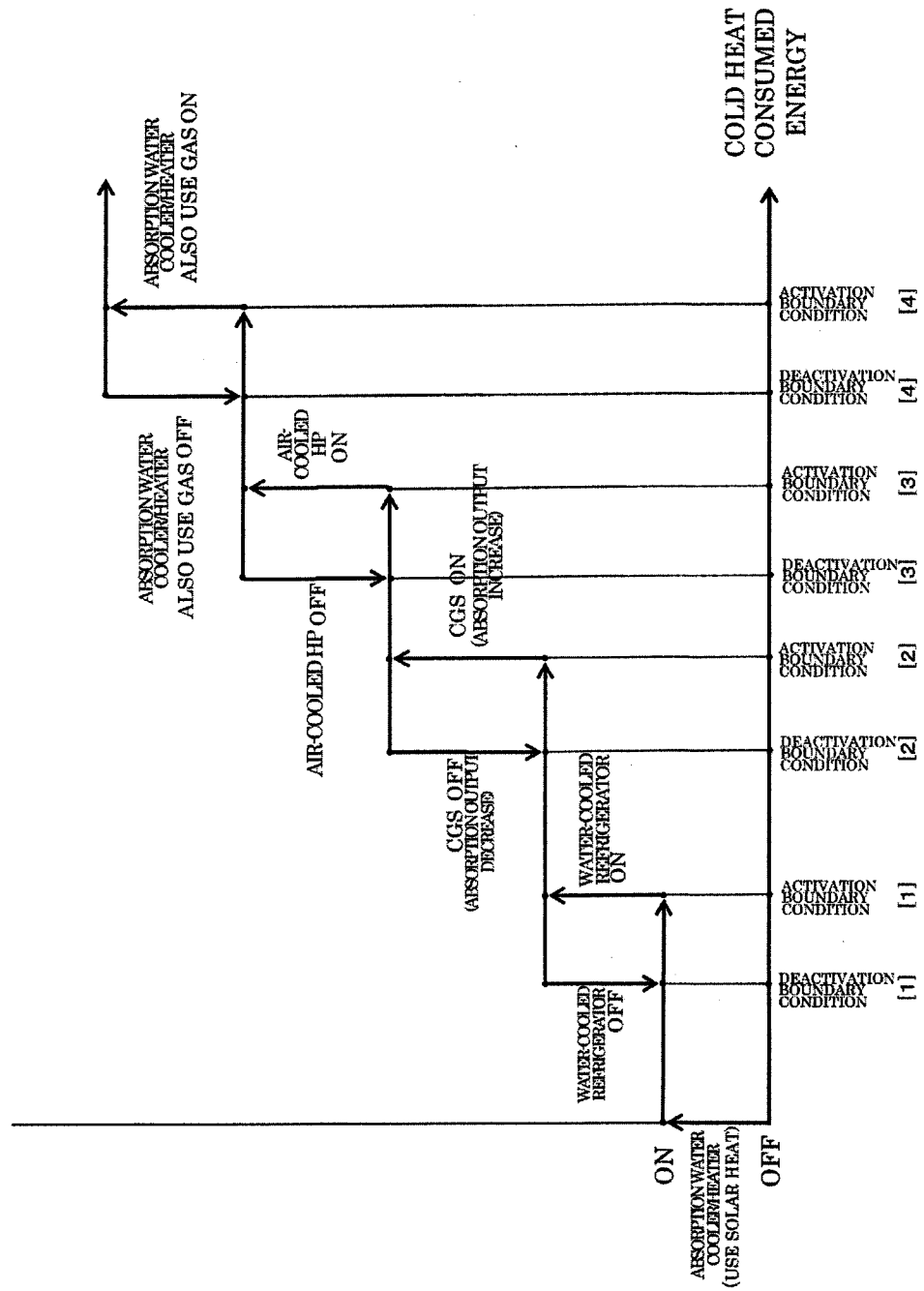


FIG. 11

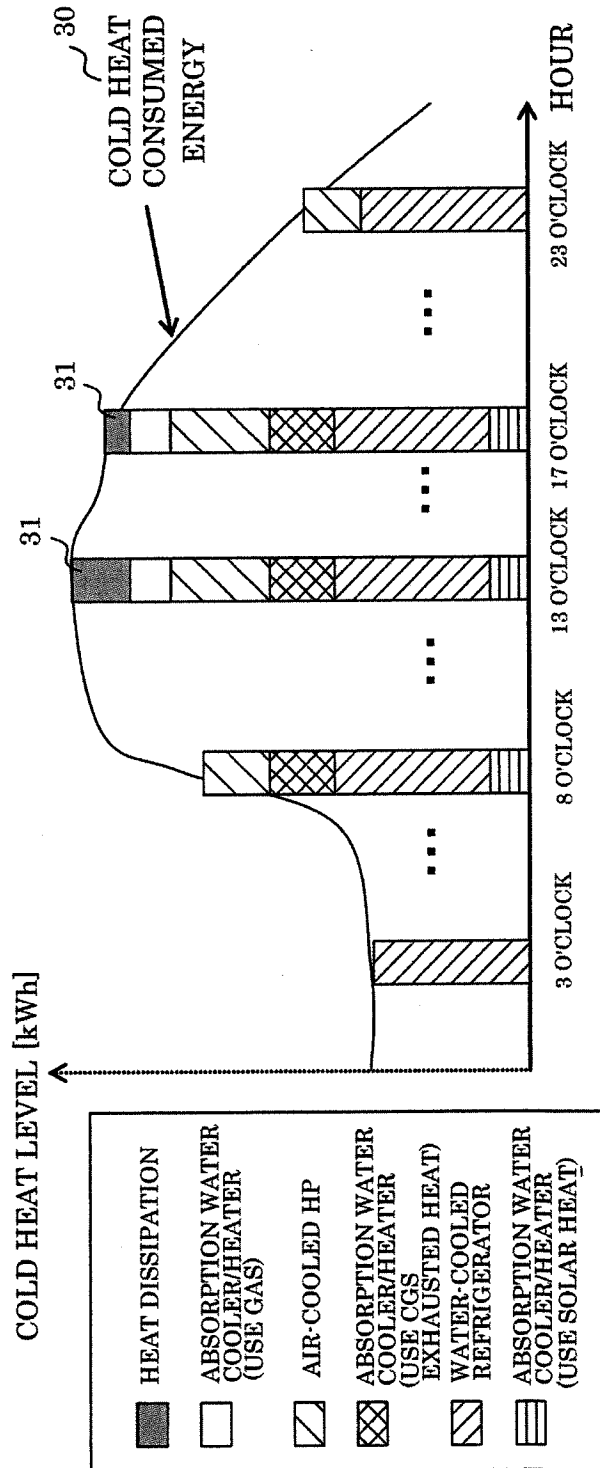


FIG. 12

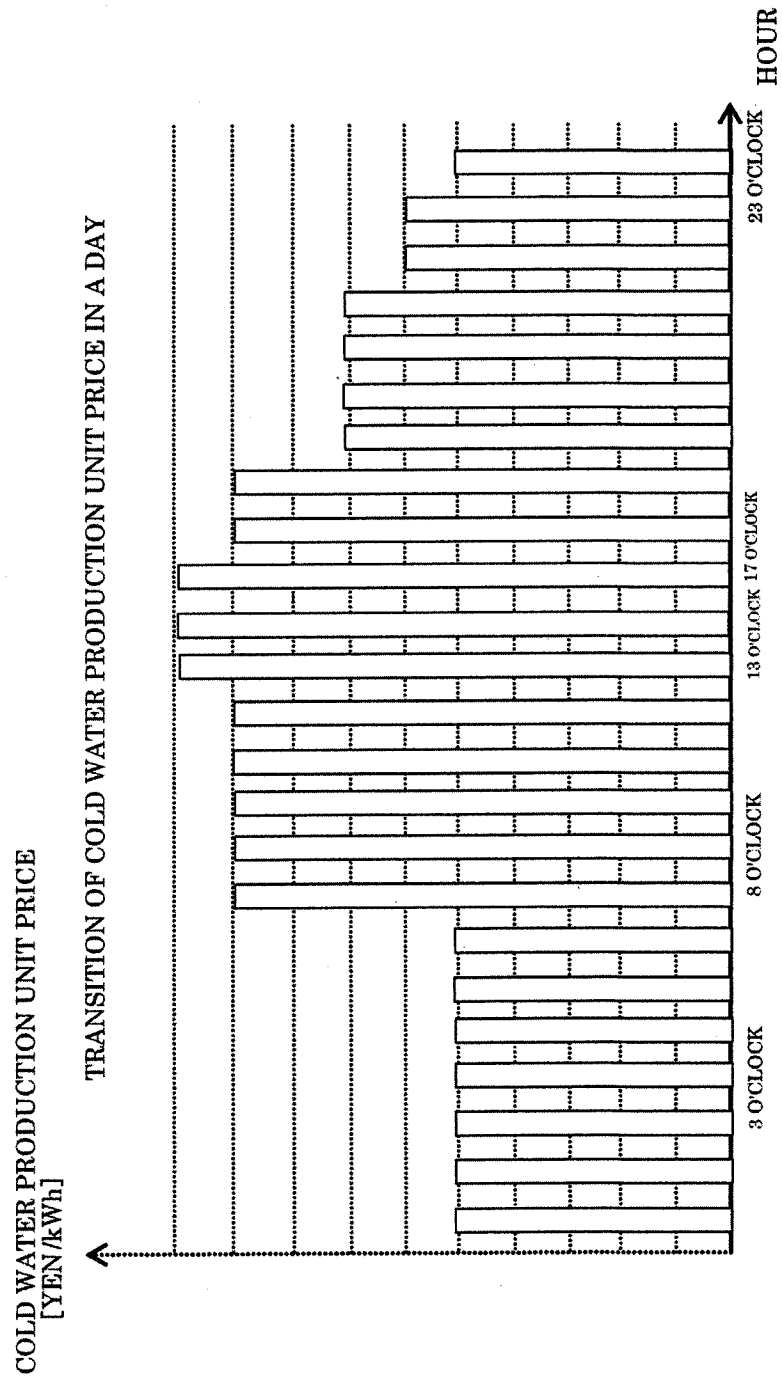


FIG. 13

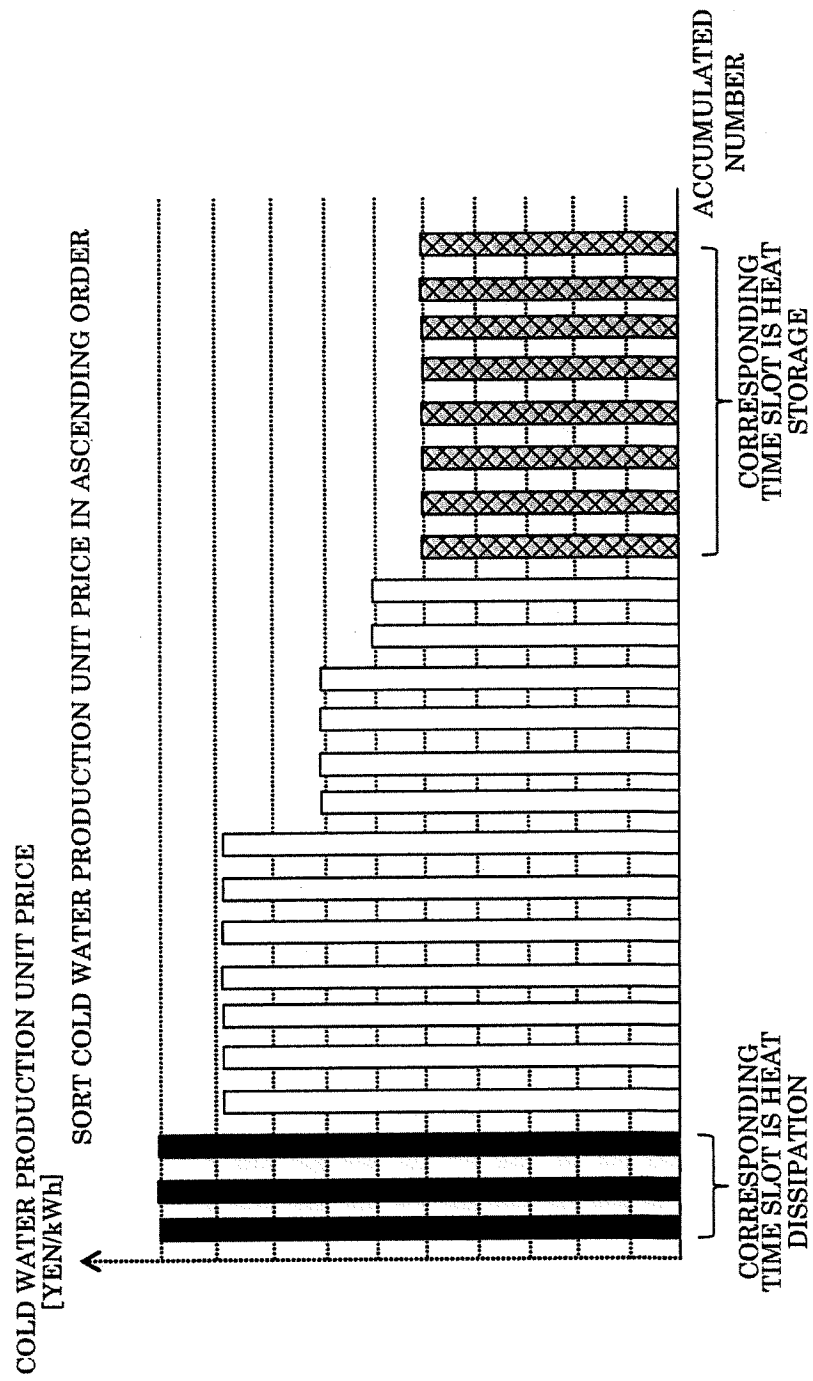
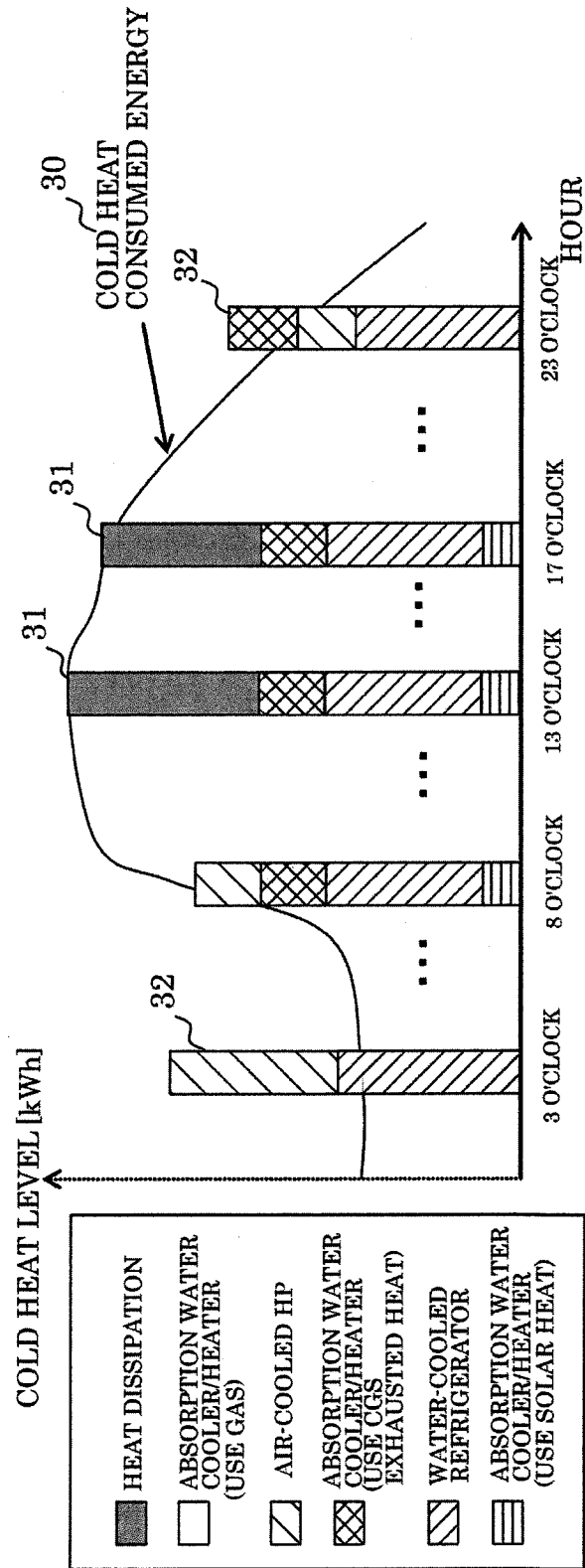


FIG. 14

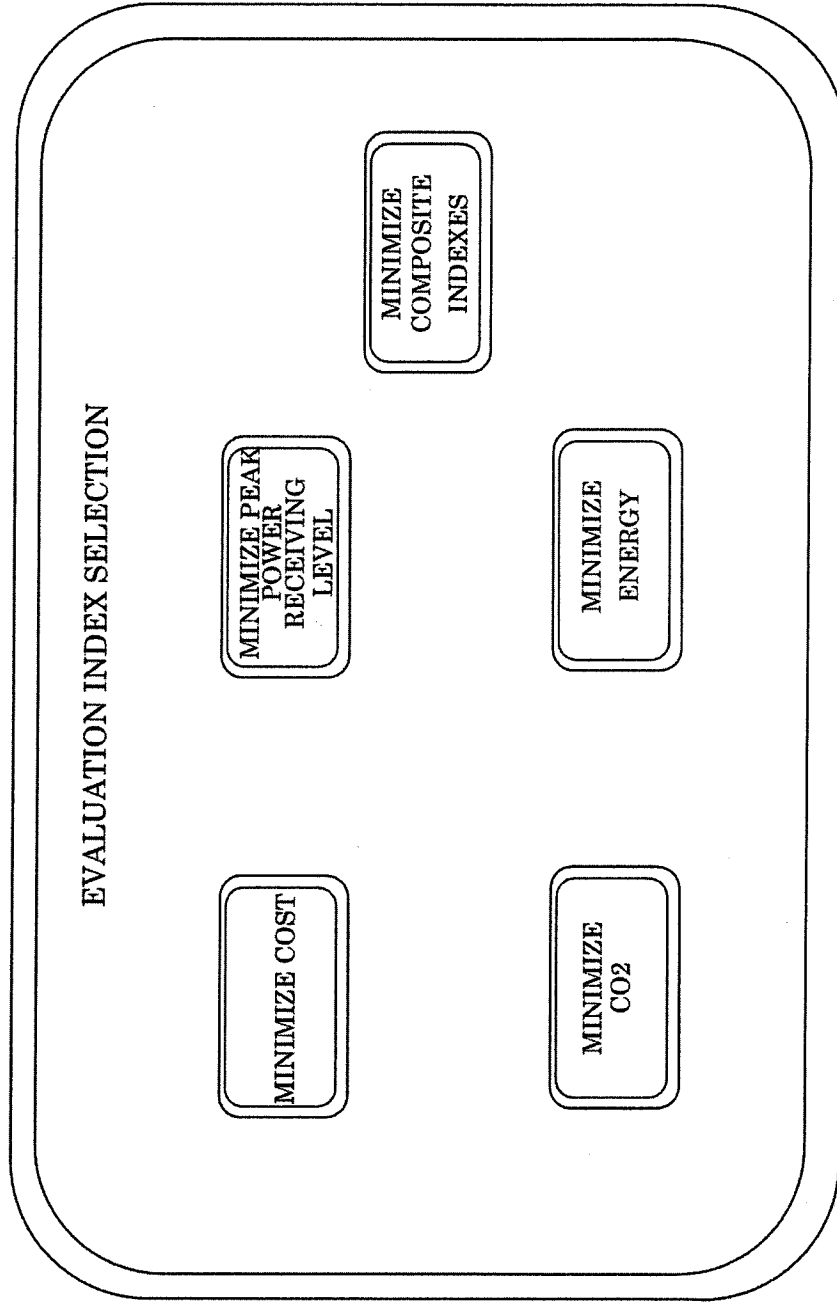


# FIG. 15

## OPTIMIZED VARIABLE LIST

| VARIABLE NAME | PHYSICAL QUANTITY                                                                | UPPER AND LOWER LIMIT                         | UNIT  |
|---------------|----------------------------------------------------------------------------------|-----------------------------------------------|-------|
| $X1$          | PURCHASED POWER LEVEL                                                            | $0 \leq X1 \leq \text{CONTRACTED POWER}$      | [kWh] |
| $X2$          | HEAT PUMP LOADING FACTOR (COLD WATER PRODUCTION)                                 | LOWER LIMIT $\leq X2 \leq 1$                  | -     |
| $X3$          | HEAT PUMP LOADING FACTOR (HOT WATER PRODUCTION)                                  | LOWER LIMIT $\leq X3 \leq 1$                  | -     |
| $X4$          | ABSORPTION WATER COOLER/HEATER LOADING FACTOR (EXHAUSTED HEAT LOADING MODE)      | LOWER LIMIT $\leq X4 \leq 1$                  | -     |
| $X5$          | ABSORPTION WATER COOLER/HEATER LOADING FACTOR (COLD WATER PRODUCTION, USING GAS) | LOWER LIMIT $\leq X5 \leq 1$                  | -     |
| $X6$          | ABSORPTION WATER COOLER/HEATER LOADING FACTOR (HOT WATER PRODUCTION, USING GAS)  | LOWER LIMIT $\leq X6 \leq 1$                  | -     |
| $X7$          | WATER-COOLED REFRIGERATOR LOADING FACTOR                                         | LOWER LIMIT $\leq X7 \leq 1$                  | -     |
| $X8$          | CGS LOADING FACTOR                                                               | LOWER LIMIT $\leq X8 \leq 1$                  | -     |
| $X9$          | REMAINING HEAT STORAGE LEVEL                                                     | $0 \leq X9 \leq \text{HEAT STORAGE CAPACITY}$ | [kWh] |
| $X10$         | REMAINING ELECTRIC STORAGE LEVEL                                                 | $0 \leq X10 \leq \text{BATTERY CAPACITY}$     | [kWh] |
| $X11$         | CGS ON / OFF                                                                     | 1 / 0                                         | -     |
| $X12$         | HEAT PUMP ON/OFF (COLD WATER PRODUCTION)                                         | 1 / 0                                         | -     |
| $X13$         | HEAT PUMP ON/OFF (HOT WATER PRODUCTION)                                          | 1 / 0                                         | -     |
| $X14$         | ABSORPTION WATER COOLER/HEATER ON/OFF (EXHAUSTED GAS LOADING MODE)               | 1 / 0                                         | -     |
| $X15$         | ABSORPTION WATER COOLER/HEATER ON/OFF (COLD WATER PRODUCTION, USING GAS)         | 1 / 0                                         | -     |
| $X16$         | ABSORPTION WATER COOLER/HEATER ON/OFF (HOT WATER PRODUCTION, USING GAS)          | 1 / 0                                         | -     |
| $X17$         | WATER-COOLED REFRIGERATOR ON/OFF                                                 | 1 / 0                                         | -     |

*FIG. 16*



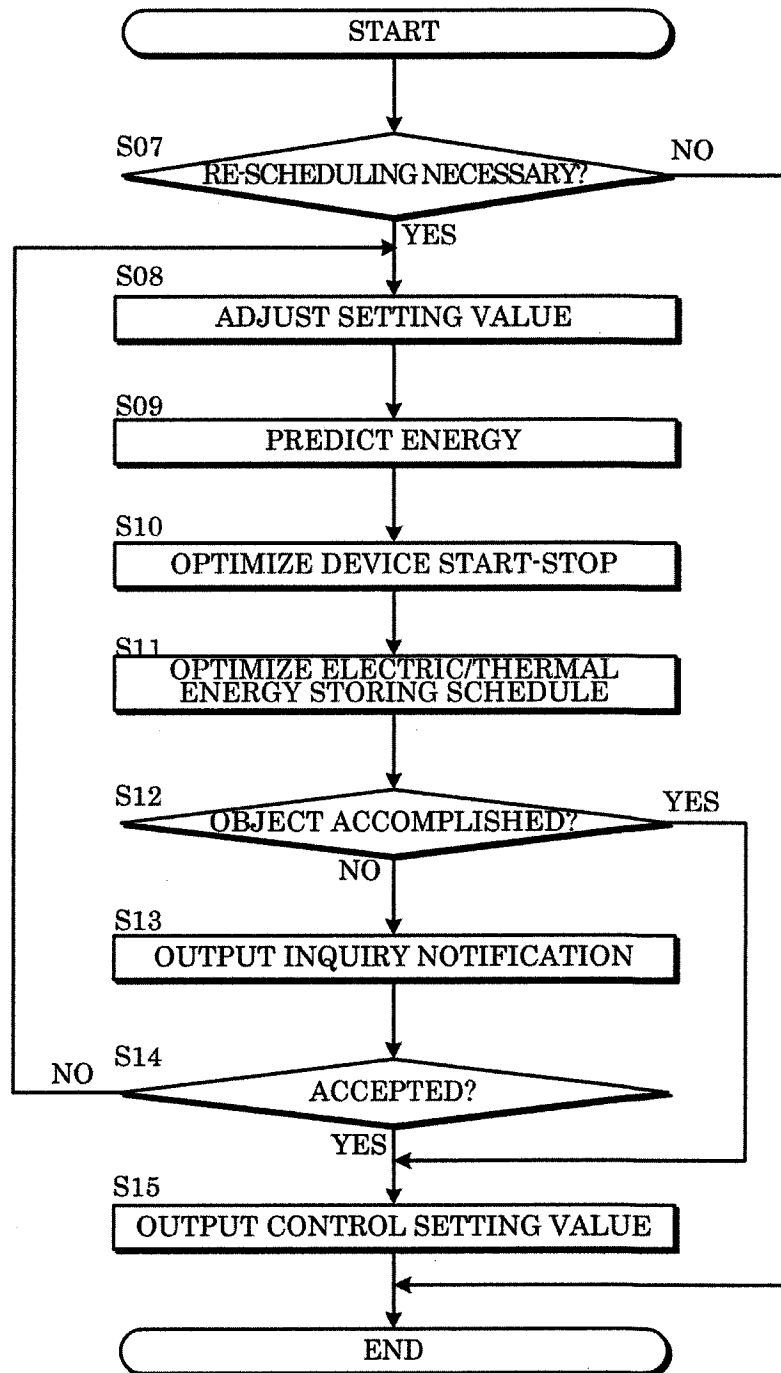
*FIG. 17*

FIG. 18

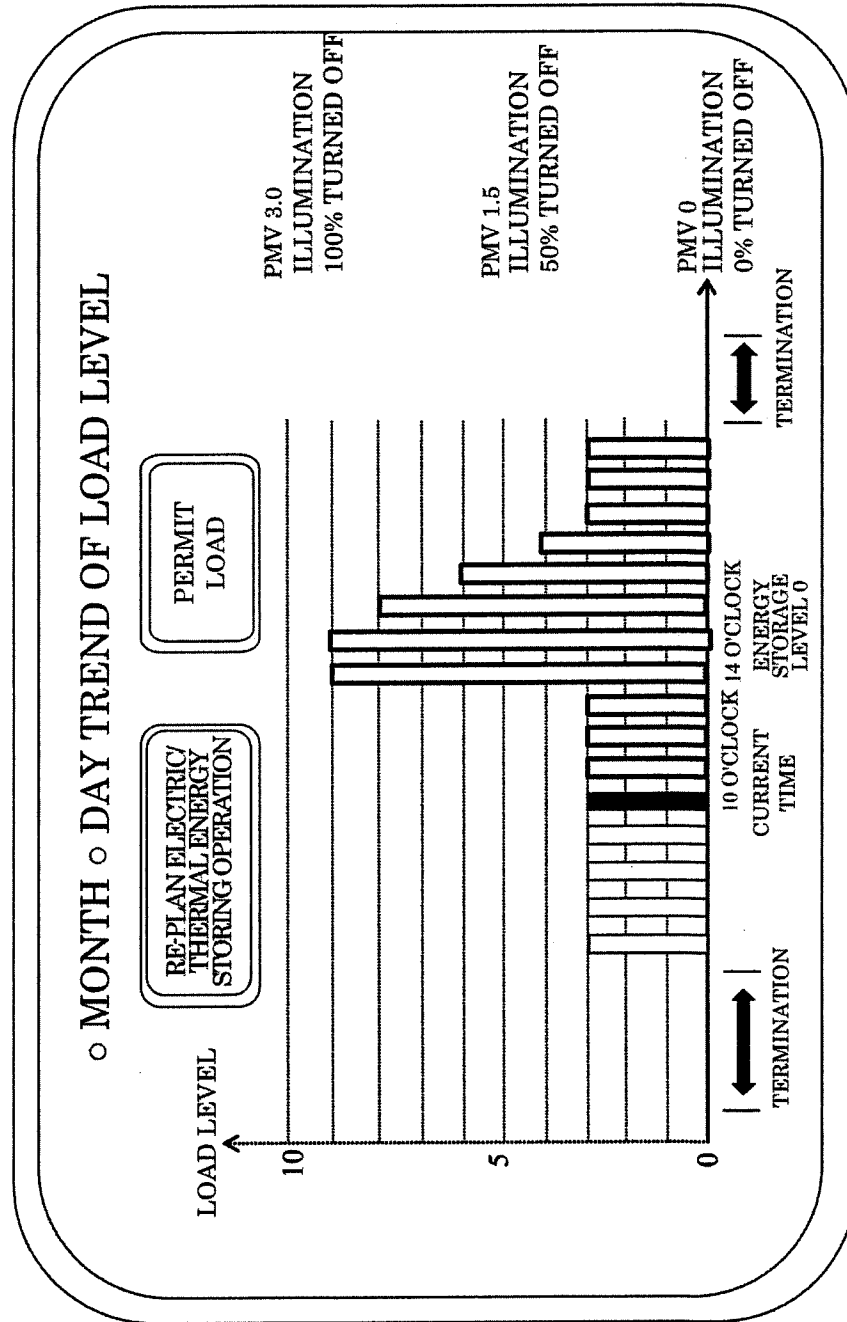


FIG. 19

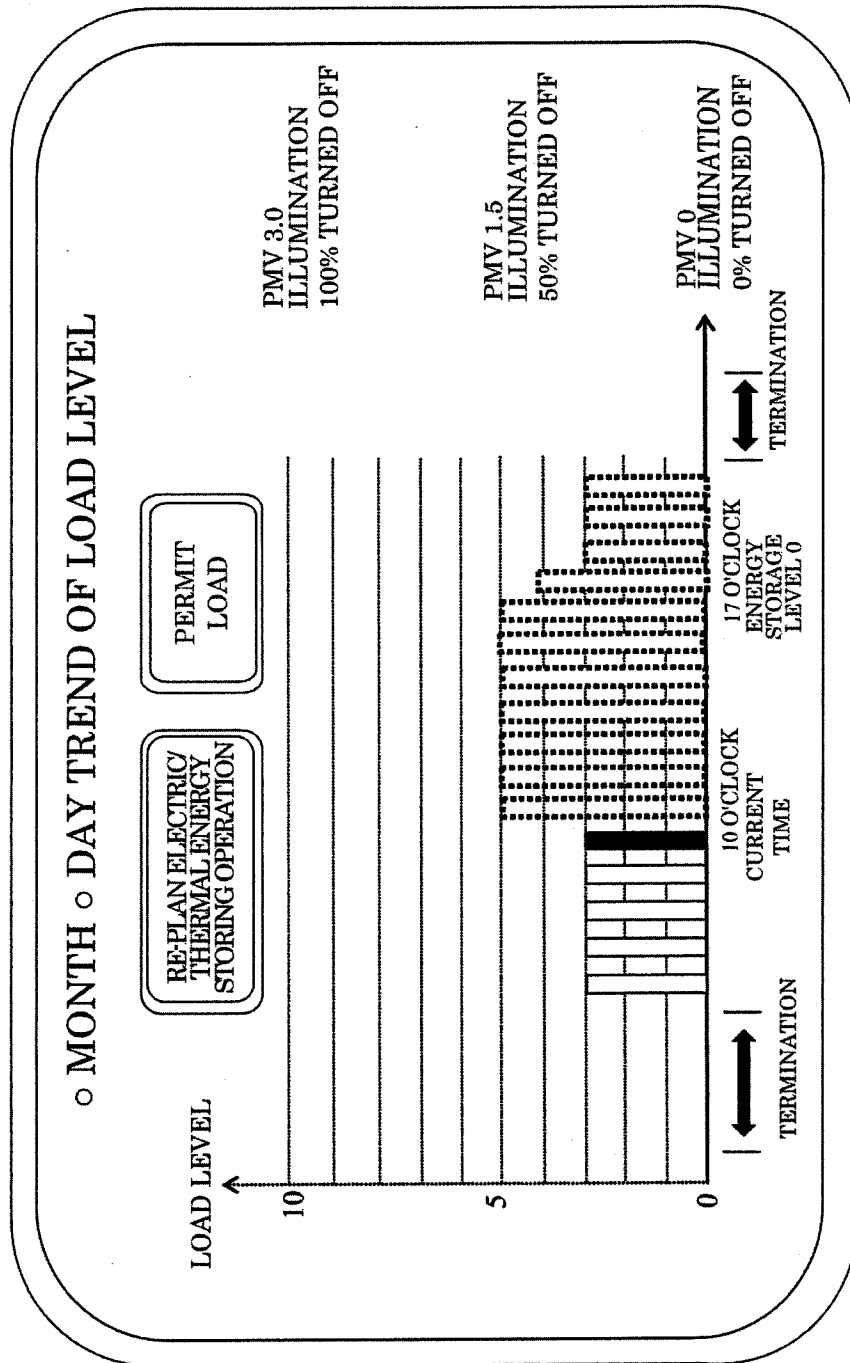


FIG. 20

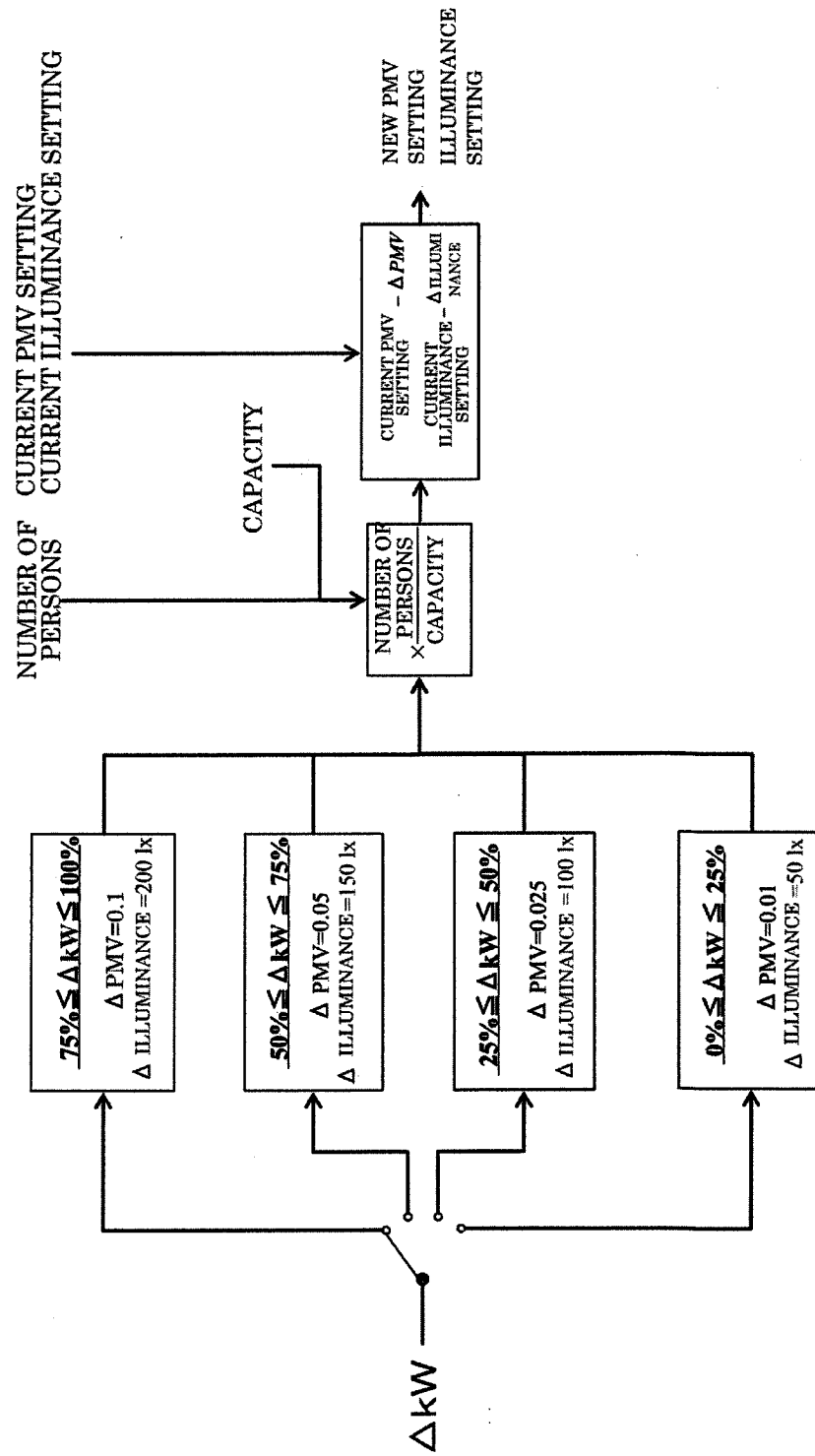


FIG. 21

