

APPARATUS FOR CALCULATING ELEVATOR CAGE CALL FORECAST

1 This invention relates to an apparatus for
calculating elevator cage call forecast.

 As is known well, the operation of an elevator
car is controlled on the basis of call information such
5 as a hall call and a cage call and also other information
including the car position so that the elevator car can
serve the hall and cage calls.

 It is also known well that, in an elevator
system including a plurality of elevator cars juxtaposed
10 for parallel operation, a method of group control is
generally employed in which information including car call
information and car position information are processed
in a central control apparatus so that the elevator cars
can be rationally operated in relation to one another.

15 It is generally acknowledged that an elevator
car or cars can provide service of higher quality when the
number of car control information is larger and the accuracy
thereof is higher.

 Standing on such a view-point, United States
20 Patent No. 4,030,572, granted on June 21, 1977 to the same
assignee as the present application, proposes an elevator
control apparatus in which a detector for detecting the
number of hall waiting passengers is disposed at the hall
of each floor so as to make forecasting calculation of
25 cage calls on the basis of the number of hall waiting

1 passensers detected by the detectors. This USP 4,030,572
is completely incorporated into the present application
as reference. The proposed elevator control apparatus
thus realizes a high degree of elevaror car group control
5 capable of calculation of the forecast waiting time for
the passengers waiting in the halls for arrival of elevator
cars at such floors and capable of rational assignment
of hall calls to the elevator cars, while also taking into
account cage calls which will be registered in future in
10 the elevator cars.

However, the proposed elevator control apparatus
is quite expensive in that it requires a detector for
detecting the number of hall waiting passengers and such
a detector must be disposed at each of the floors and
15 for each of the elevator cars.

Further, in some cases, the hall waiting passenger
detectors cannot be disposed at the elevator halls due to
structural and/or design limitations of the elevator halls.

Because of the facts described above, an elevator
20 control apparatus such as that proposed in USP 4,030,572,
which is capable of attaining a high degree of elevator
car group control by the forecast of cage calls, has not
yet been put into practical use.

It is therefore a primary object of the present
25 invention to provide an economical and versatile apparatus
which can forecast, by calculation, cage calls which will
be registered in future in an elevator car, without the
necessity for detecting the number of hall waiting

passengers.

According to the present invention there is provided an apparatus for calculating cage call forecast of an elevator car in an elevator system including cage call registering means disposed in said elevator car for specifying destination floors among a plurality of
5 floors to be served by said elevator car, hall call registering means disposed at the elevator hall of each of said plurality of floors for calling said elevator car thereto, and means for operating said elevator car so that said elevator car can serve said plurality of floors in
10 response to cage calls registered by said cage call registering means and hall calls registered by said hall call registering means, said apparatus comprising: hall call counting means for counting the number of hall calls originated from a given one of said floors; cage call counting means for counting the number of cage calls, classified by
15 destination floors, registered in the elevator car after the elevator car has served each of the hall calls originated from said given one floor; and cage call origination probability calculating means for calculating the probabilities of origination of cage calls, classified by destination floors, which will be registered in said
20 elevator car after said elevator car has subsequently served a new hall call originating from said given one floor, on the basis of the number of the hall calls counted by said hall call counting means and the number of the cage calls, classified by destination floors, counted by said cage call counting means.

25 An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which;

FIG. 1 shows the operation of an elevator car for illustrating the basic principle of the present invention;

FIGs. 2 to 8 show a preferred embodiment of the cage call
30 forecasting apparatus according to the present invention, in which FIG 2 being a block diagram showing generally the structure of the cage call forecasting apparatus embodying the present invention, FIG. 3 showing the arrangement of memory tables in the RAM 4 shown in _____

1 FIG. 2, FIG. 4 showing the constitution of a memory table
of probabilities of origination of cage calls classified
by destination floors, FIG. 5 showing the constitution
of a memory table of probabilities of origination of
5 cage calls classified by destination floors and classified
also by the days of a week, FIG. 6 being a flow chart of
a main program executed by the microcomputer 1 shown in
FIG. 2, FIG. 7 being a flow chart of a sub-program for
counting the number of cage calls classified by destination
10 floors, and FIG. 8 being a flow chart of a sub-program
for calculating the probabilities of origination of cage
calls classified by destination floors; and

FIG. 9 is a flow chart of a program for forecast-
ing by calculation the presence or absence of origination
15 of cage calls classified by destination floors.

First of all, the basic principle of the present
invention will be explained with reference to FIG. 1
which shows operation of an elevator car.

FIG. 1 illustrates that an elevator car arranged
20 for serving between the 1st floor and the 8th floor of a
building has arrived at the 2nd floor to serve an up hall
call originated from the 2nd floor.

This 2nd floor will now be specifically noted
for the purpose of explanation. Suppose that a succession
25 of four up hall calls have been actually originated from
the 2nd floor within a predetermined period of time t ,
and after the elevator car has served each of these up
hall calls, cage calls shown by the black dots have been

- 1 actually registered in the elevator car. Suppose, as shown in Fig. 1, that cage calls for travel to the 4th, 5th and 6th floors; the 5th and 6th floors; the 4th and 5th floors; and the 4th and 5th floors are registered
5 after the elevator car has respectively served the 1st, 2nd, 3rd and 4th up hall calls originated from the 2nd floor.

We will now discuss the probabilities P_{ij} of origination of cage calls classified by destination floors
10 within the predetermined period of time t under the situation of elevator car service above described. That is, we will discuss the probability P_{ij} of travel of passengers who ride in the elevator car at the i -th floor and want to be carried to the j -th floor.

- 15 In FIG. 1, the probability P_{ij} of travel from the 2nd floor to the 3rd floor is $0/4 = 0$. The probability P_{ij} of origination of cage calls in each of all the probable cases can be similarly calculated as follows:

$$\left. \begin{aligned} P_{23} &= 0/4 = 0 \\ P_{24} &= 3/4 = 0.75 \\ P_{25} &= 4/4 = 1.0 \\ P_{26} &= 1/4 = 0.25 \\ P_{27} &= 1/4 = 0.25 \\ P_{28} &= 0/4 = 0 \end{aligned} \right\} \text{----- (1)}$$

- It will be seen that the probability P_{25} of travel from
20 the 2nd floor to the 5th floor is 1.0, and this proves

1 that the 2nd and 5th floors are intimately related with
each other. The probability P_{23} of travel from the 2nd
floor to the 3rd floor is zero, and the probability P_{28}
of travel from the 2nd floor to the 8th floor is also
5 zero. This proves that the 2nd floor has no substantial
concern with the 3rd and 3th flloors from the aspect of,
for example, business.

It will thus be seen that the probabilities P_{ij}
of origination of cage calls classified by destination
10 flloors can be determined by counting the number of past
hall calls and cage calls served by the elevator car and
calculating similarly to the equations (1). Such traffic
information can be utilized as elevator control data.
For example, such traffic information can be utilized as
15 the forecast cage calls disclosed in the above-mentioned
USP 4,030,572..

The general expression for calculating the
probabilities P_{ij} of origination of cage calls classified
by destination floors is as follows:

$$P_{ij} = \frac{\sum C_{ij}}{\sum H_i} \text{ ----- (2)}$$

20 where $\sum C_{ij}$ represents the total number of cage calls
registered by passengers who ride in the elevator car at
the i-th floor and want to travel to the j-th floor within
the predetermined period of time t, and $\sum H_i$ represents
the total number of hall calls originated at the i-th
25 floor within the predetermined period of time t. It is

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- 1 apparent that H_i represents the total number of up hall calls when $i < j$ and the total number of down hall calls when $i > j$.

Table 1

		ΣH_i $i > j$	Destination Floor (j)								ΣH_i $i < j$
			1	2	3	4	5	6	7	8	
Hall call originating floor (i)	1	0		3	2	4	5	3	2	5	20
	2	4	4		1	0	2	4	2	1	8
	3	5	4	2		0	1	3	2	2	7
	4	3	3	1	1		2	0	0	0	2
	5	9	6	2	0	3		2	3	2	5
	6	5	2	3	2	0	2		4	3	6
	7	9	4	1	1	0	2	4		3	3
	8	11	5	2	2	0	1	3	2		0

Table 2

		Destination Floor (j)							
		1	2	3	4	5	6	7	8
Hall call originating floor (i)	1		0.15	0.1	0.2	0.25	0.15	0.1	0.25
	2	1.0		0.125	0	0.25	0.5	0.25	0.125
	3	0.8	0.4		0	0.143	0.429	0.286	0.286
	4	1.0	0.333	0.333		1.0	0	0	0
	5	0.667	0.182	0.182	0.273		0.25	0.6	0.25
	6	0.4	0.6	0.6	0	0.4		0.667	0.5
	7	0.444	0.111	0.111	0	0.222	0.444		1.0
	8	0.455	0.182	0.182	0	0.090	0.273	0.182	

1 Table 1 shows an example of the results of
counting of the number C_{ij} of registered cage calls
classified by destination floors and the number ΣH_i of
originated hall calls within the predetermined period of
5 time, and Table 2 shows the probabilities P_{ij} of origination
of cage calls classified by destination floors, calculated
on the basis of the data shown in Table 1. In Table 2,
the probability P_{ij} of origination of cage calls for
travel from the 7th floor to the 8th floor is 1.0, and
10 the probability P_{ij} of origination of cage calls for
travel from the 2nd floor to the 1st floor is also 1.0.
This is because the 1st and 8th floors are the terminal
floors, and a cage call is necessarily registered in the
elevator car for travel from the 8th floor to the 8th floor
15 or travel from the 2nd floor to the 1st floor. The probabi-
lity P_{ij} of origination of cage calls for travel from the
4th floor to the 1st floor is 1.0. This indicates that
a cage call for travel from the 4th floor to the 1st
floor is similarly necessarily registered in the elevator
20 car. On the other hand, the probability P_{ij} of origination
of cage calls for travel from the 4th floor to the 6th
floor is zero which is the minimum. This indicates that
there is substantially no intimate relation therebetween
from the aspect of business.

25 The probabilities P_{ij} of origination of cage
calls classified by destination floors, described above,
can be easily calculated by means of an LSI element
capable of arithmetic processing of data such as a micro-

1 computer.

In an office building, for example, there are generally some kinds of business relations among the specific floors, and the destination floors are fixed in many cases. Further, there are specific floors such as the restaurant floor and the lobby floor in the building. Cage calls for travel to the restaurant floor are necessarily registered in the lunch time, and cage calls for travel to the lobby floor are necessarily registered in the office closing time. Thus, the traffic flow is fixed depending on the character of a building. Utilizing the above fact, the present invention calculates the probabilities P_{ij} of origination of cage calls classified by destination floors. When the probability P_{ij} of origination of cage calls for travel between the i -th floor and the j -th floor is proved to be high, this indicates that is an intimate relationship between these floors. Therefore, by the use of such data, cage calls that will be registered in future can be forecast by calculation, and, also, the arrival time of the elevator car at a specific floor can be forecast by calculation. Further, by printing out and analyzing the data, the traffic flow in the building can be grasped.

FIG. 2 is a block diagram showing the structure of a preferred embodiment of the cage call forecast calculating apparatus according to the present invention. Referring to FIG. 2, a microcomputer 1 is composed of a microprocessor unit (hereinafter abbreviated as an MPU) 2,

1 a read-only memory (hereinafter abbreviated as an ROM)
3, a random access memory (hereinafter abbreviated as an
RAM) 4, an input interface 5 and an output interface 6.

An elevator system 7, which is known well in the
5 art, includes a hall call register H disposed at each of
the floors and manipulated by a passenger who wants to
travel in the up or down direction from that floor by the
elevator car, a cage call register C disposed in the
elevator car and manipulated by a passenger who designates
10 his destination floor, and an elevator car control unit
CCA for controlling the operation of the elevator car.

The microcomputer 1 receives necessary informa-
tion (such as hall call information, cage call informa-
tion, car position information and door open-close
15 command information) from the elevator system 7 through
the input interface 5, and, after calculating the fore-
cast or future cage calls, applies the result of calcula-
tion to a group control system or elevator car control
system 8.

20 For the above purpose, the ROM 3 in the micro-
computer 1 stores a calculation program for cage call
forecast and any other necessary data, and the RAM 4
stores memory tables such as those shown in Tables 1 and
2 in an arrangement as shown in FIG. 3. Referring to
25 FIG. 3, a table 4a of the counts C_{ij} of cage calls
classified by destination floors, a table 4b of the counts
 H_i of hall calls classified by hall-call originating
floors, and a table 4c of the probabilities P_{ij} of

1 origination of cage calls classified by destination floors
are stored in the RAM 4 in the above order. In the embodi-
ment, a day is divided into a plurality of time zones,
and the cage call origination probabilities P_{ij} in the
5 individual time zones are stored in the table 4C, as
will be described presently with reference to FIG. 4.

Referring to FIG. 4, the first block 8-1 in the
table 4C includes data sampled during a period of 15
minutes from, for example, the time 8:00 to the time
10. 8:15. Thus, as seen in FIG. 4, data sampled during a
period of 10 hours ranging from the time 8:00 to the
time 19:00 at time intervals of 15 minutes are stored as
respective blocks 8-1, 8-2, 8-3, 8-4, 9-1,, 18-3
and 18-4. Therefore, the table 4C tabulates the results
15 of calculation of the probabilities P_{ij} of origination of
cage calls classified by destination floors, in the
divided time zones.

The period of time is limited to within the
range of from 8:00 to 19:00 for the purpose of minimizing
20 the capacity of the RAM 4. Generally, the greater
proportion of traffic demand appears within the period
of 10 hours between the morning and the evening, and,
therefore, calculation of the probabilities P_{ij} within the
limited period of 10 hours is considerably effective,
25 although not fully satisfactory. It is needless to
mention that the sampling may be made throughout the day.

Further, in order to minimize the capacity of
the RAM 4, the sampling may be made at relatively short

1 time intervals in the time zones in which there is much
traffic demand and it may be made at relatively long
time intervals in the time zones in which there is less
traffic demand. Data may be classified by the days of
5 a week. Referring to FIG. 5, each of the blocks A, B,
C, D, E, F and G corresponds to the blocks 8-1 to 18-4
in the table 4C shown in FIG. 4. More precisely, data
sampled in the individual days of a week are stored in
the blocks A, B, C, D, E, F and G respectively.

10 Further, although not illustrated, data sampled in the
respective months of a year may be similarly stored.
When the data classified by the days of a week or by the
months of a year are stored in the RAM 4, a large capacity
is inevitably required for the RAM 4. To avoid the
15 increase in the capacity of the RAM 4, it is desirable
to additionally provide an auxiliary memory such as a
magnetic tape cassette or a floppy disk. This method
is effectively applied to a building in which the traffic
demand varies depending on the days of a week or months
20 of a year.

The above description has clarified the arrangement
of the memory tables in the RAM 4. Description will now
be directed to the procedure for calculation of the
probabilities P_{ij} of origination of cage calls classified
25 by destination floors. That is, description will be
directed to a program stored in the ROM 3 to be executed
by the microcomputer 1.

FIG. 6 is a flow chart of a preferred form of a

- 1 main program executed by the microcomputer 1 to calculate the probabilities P_{ij} of origination of cage calls classified by destination floors. Referring to FIG. 6, steps P10 to P40 are executed to detect the period of
- 5 time from a door-open command to a deceleration command, that is, the period of time from the time at which the door of the elevator car is opened at a specific floor to accommodate a hall waiting passenger or passengers to the time at which the elevator car begins to decelerate
- 10 next. During this period of time, the passengers ridden in the elevator car at the specific floor register cage calls. During this detected period of time a cage call totalizing flag F is set at $F = "1"$. Otherwise, the flag F is set at $F = "0"$.
- 15 Then, in step P50, whether or not the elevator car should be stopped to serve a hall call is checked, and when the result of checking proves that the elevator car should be stopped to serve the hall call, the elevator car position is set at 1 in step P60 so as to
- 20 determine the location of the car position data in the specific memory table. In step P70, the direction of movement of the elevator car is detected, and, the up hall call count table or the down hall call count table is incremented in step P80 or P90 depending on the direction
- 25 of movement of the elevator car.

In step P100, whether or not the cage call totalizing flag F described in step P20 is set at $F = "1"$ is checked, and, when the result of checking proves that

1 F = "1", a sub-program for counting cage calls classified
by destination floors is executed in step P110. Then,
completion of the cage call totalization continued for a
predetermined period of time, that is, termination of
5 the predetermined sampling period of time is judged in
step P120. In step P130, a sub-program for calculating
the probabilities P_{ij} of origination of cage calls clas-
sified by destination floors is executed, and, in step
P140, the memory tables shown in FIG. 3 are cleared
10 so as to receive data sampled in the next sampling
period of time. The step P140 completes the main program
shown in FIG. 6. This main program is executed at
intervals of the predetermined period of time.

FIG. 7 is a flow chart of an embodiment of the
15 step P110 (the sub-program for counting cage calls
classified by destination floors) in the main program shown
in FIG. 6, and FIG. 8 is a flow chart of an embodiment of
the step P130 (the sub-program for calculating the probabi-
lities P_{ij} of origination of cage calls classified by
20 destination floors) in the main program shown in FIG. 6.

In the sub-program shown in FIG. 7, new cage
calls registered at the i -th floor served by the elevator
car are counted for each of the destination floors. In
step P110-2, judgment is made as to whether or not a
25 new cage call for travel from the i -th floor to the j -th
floor has been registered. When the result of judgment
proves that such a new cage call has been registered,
step P110-3 is executed in which the table $C(i, j)$ of the

1 counts of cage calls classified by destination floors is
incremented. The above process is executed for each j-th
floor, from the 1st floor to the 8th floor, and, when
completion of the processing on all the floors is detected
5 in step P110-4, this sub-program P110 terminates.

In the sub-program shown in FIG. 8, the probabili-
ties P_{ij} of origination of cage calls classified by
destination floors, given by the equation (2), are calcu-
lated. More precisely, the probability P_{ij} of origination
10 of a cage call for travel from the i-th floor to the
j-th floor is calculated. This i-th floor represents each
of the hall call originating floors (the 1st floor to the
8th floor), and the j-th floor represents each of the
destination floors (the 1st floor to the 8th floor).
15 Thus, the cage call origination probability P_{ij} is calcu-
lated for each of the hall call originating floors. In
step P130-3, the ordinal of the i-th floor from which a
hall call has been originated is compared with that of
the j-th floor which is the destination floor. When the
20 result of comparison proves that $i < j$, step P130-4 is
executed in which the probability P_{ij} of origination of
up cage calls for travel from the i-th floor to the j-th
floor is calculated. On the other hand, when the result
of comparison proves that $i > j$, step P130-5 is executed
25 in which the probability P_{ij} of origination of down cage
calls for travel from the i-th floor to the j-th floor
is calculated. The relation $i = j$ never holds, and no
calculation is done.

1 By the execution of the above steps, all of the probabilities P_{ij} of origination of cage calls classified by destination floors, shown in Table 2, can be calculated.

5 In step P130-8, the probabilities P_{ij} of origination of cage calls classified by destination floors, calculated by the above steps, are classified by the time zones of a day, by the days of a week and by the months of a year and are transferred to the RAM 4 to be stored in the corresponding memory table. In this manner, the
10 tables of the cage call origination probabilities P_{ij} classified by the time zones of a day, by the days of a week and by the months of a year, as shown in FIGs. 4 and 5 can be prepared.

As aforementioned, according to this embodiment
15 may provide, in the first place, the probabilities of origination of cage calls classified by destination floors, as new control information to be utilized for the elevator car control. The probability of origination of cage calls is, in other words, the forecast value of generation of
20 cage calls. Therefore, as described in detail in the above-mentioned USP 4,030,572, the forecast waiting time can be calculated on the basis of the cage call forecast in a manner as will be described now. Suppose, for example, that a period of time of 10 seconds is required
25 for the elevator car to stay at a floor to serve a corresponding cage call. Then, the value obtained by multiplying 10 seconds by the cage call origination probability P_{ij} is calculated to be the period of time required for

1 the elevator car to stay at the floor corresponding to
the forecast cage call. In the forecast of the presence
or absence of origination of a cage call, judgment may be
made as to whether the cage call origination probability
5 P_{ij} is more than a predetermined setting, as described
later with reference to FIG. 9. Thus, the cage call
origination probabilities P_{ij} according to the embodiment
can be utilized for the forecast of origination of cage
calls, the calculation of forecast waiting times, etc.,
10 thereby satisfying the demand for better elevator service.

In the second place, any especial units are
unnecessary because future cage calls can be forecast on
the basis of existing information including cage call
information, hall call information and car control infor-
15 mation. For example, the control of the elevator car
taking into account the forecast cage calls described in
the above-mentioned USP 4,030,572 is made possible
without requiring the provision of the detectors detecting
the number of hall waiting passengers.

20 Thirdly, the accuracy of elevator control can
be improved because future cage calls can be forecast by
calculatoin to meet the ever-changing traffic demand and
also the traffic flow varying depending on the time zone.

FIG. 9 is a flowchart of a program for fore-
25 casting the presence or absence of origination of a cage
call on the basis of the aforementioned probabilities
 P_{ij} of origination of cage calls classified by destination
floors. As shwon in FIG. 9, judgment is made in step

1 P151 as to whether or not a hall call is originated from
the i-th floor. When the result of judgment is "Yes",
judgment is made in step P152 as to whether this hall call
is an up hall call or a down hall call. When it is an
5 up hall call, judgment is made in step P154 as to whether
the cage call origination probability P_{ij} for each of the
destination floors ($j=i+1$ to 8) is more than a predeter-
mined setting TH_k . When the result of judgment for the
j-th floor proves that $P_{ij} \geq TH_k$, the forecast cage
10 call $PC(i, j)$ for travel to the j-th floor is set at "1"
in step P155, while, when the result of judgment proves
that $P_{ij} < TH_k$, the forecast cage call $PC(i, j)$ for travel
to the j-th floor is set at "0" in step P156. In the
case of a down hall call, steps P159 to P161 are similarly
15 executed for each of the destination floors ($j=i-1$ to 1).
This predetermined setting TH_k may be selected to be a
value corresponding to the value 0.6 to 1.0 of the cage call
origination probability depending on the purpose of
utilization of forecast cage calls.

20 By the execution of the program shown in FIG. 9,
it is possible to immediately forecast the presence or
absence of cage calls that will be registered in the
elevator car which serves a floor from which a hall call
is originated.



CLAIMS:

1. An apparatus for calculating cage call forecast of an elevator car in an elevator system including cage call registering means disposed in said elevator car for specifying destination floors among a plurality of floors to be served by said elevator car, hall call registering means disposed at the elevator hall of each of said plurality of floors for calling said elevator car thereto, and means for operating said elevator car so that said elevator car can serve said plurality of floors in response to cage calls registered by said cage call registering means and hall calls registered by said hall call registering means, said apparatus comprising:

hall call counting means for counting the number of hall calls originated from a given one of said floors;

cage call counting means for counting the number of cage calls, classified by destination floors, registered in the elevator car after the elevator car has served each of the hall calls originated from said given one floor; and

cage call origination probability calculating means for calculating the probabilities of origination of cage calls, classified by destination floors, which will be registered in said elevator car after said elevator car has subsequently served a new hall call _____ originating from said given one floor, on the basis of the number of the hall calls counted by said hall call counting means and the number of the cage calls, classified

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by destination floors, counted by said cage call counting means.

2. An apparatus as claimed in Claim 1, wherein said hall call counting means includes means for counting the number of hall calls originated from each of said plurality of floors, wherein said cage call counting means includes means for counting the number of cage calls for each of destination floors, and wherein said cage call origination probability calculating means calculates the probability of origination of cage calls, classified by designation floors, for each of said plural floors, on the basis of the count of hall calls originated from each of said plurality of floors and the count of cage calls registered in said elevator car at each of said plural floors.

3. An apparatus as claimed in Claim 1, wherein said hall call counting means counts the number of said hall calls classified by up and down directions, wherein said cage call counting means counts the number of said cage calls classified by up and down directions as well as by destination floors, and said cage call origination probability calculating means calculates said probability of origination of cage calls classified by up and down directions.

4. An apparatus as claimed in Claim 1, wherein said cage call origination probability calculating means calculates said probability of origination of cage calls on the basis of the ratio between the counted number of said cage calls and the counted number of said hall



calls.

5. An apparatus as claimed in Claim 1, wherein said cage call origination probability calculating means calculates said probability of origination of cage calls on the basis of the counted number of said cage calls counted within a predetermined period of time and the counted number of said hall calls.

6. An apparatus as claimed in Claim 1, wherein a part of day is divided into a plurality of time zones, and said cage call origination probability calculating means calculates said cage call origination probabilities classified by the time zones.

7. An apparatus as claimed in Claim 1, wherein said cage call origination probability calculating means calculates said cage call origination probabilities classified by the days of a week.

8. An apparatus as claimed in Claim 1, wherein said cage call counting means counts the number of cage calls, classified by destination floors, originated after the door of said elevator car has been opened at said given one floor but before said elevator car is decelerated toward a next destination floor to be served.

9. An apparatus as claimed in Claim 1, wherein means are provided for comparing each of said cage call origination probabilities classified by destination floors with a predetermined setting and forecasting the presence or absence of cage calls, classified by destination.

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floors, which will be registered in said elevator car at said given one floor.

10. An apparatus substantially as hereinbefore described with reference to, and as illustrated in Figures 2 to 9 of the accompanying drawings.
