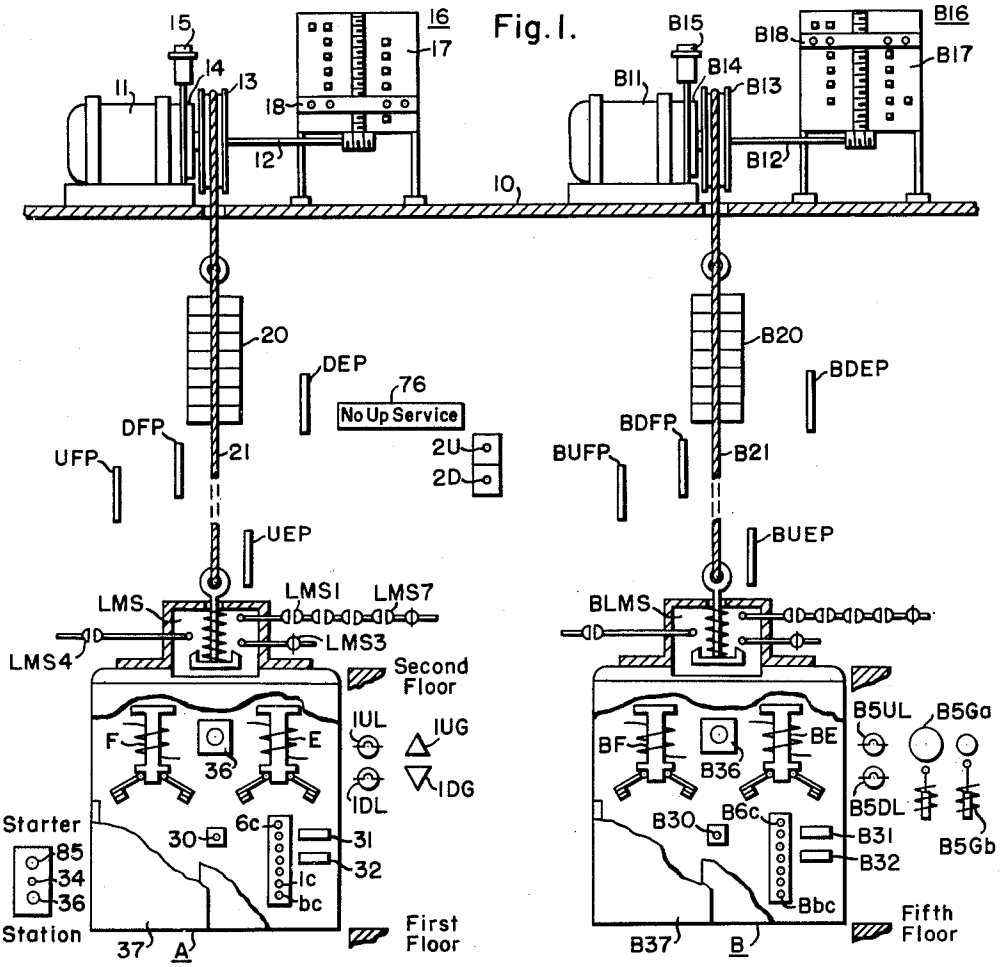
April 18, 1961 G. E. YEAKLEY 2,980,886

ELEVATOR SYSTEMS HAVING AUDIBLE CAR-DIRECTION SIGNALS

Filed Sept. 14, 1956 3 Sheets-Sheet 1

Fig. 1.



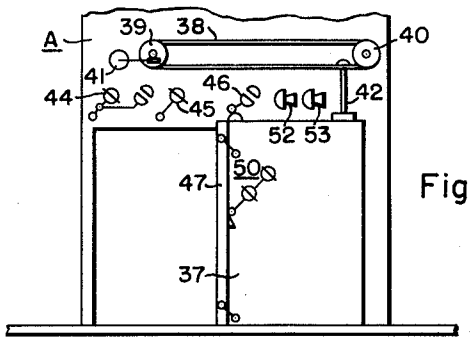




Fig. 2.

WITNESSES

Edwin E. Bartlett

Leon J. Zaya

INVENTOR

Glen E. Yeakley

BY C. L. Freedman

ATTORNEY

April 18, 1961 G. E. YEAKLEY 2,980,886

ELEVATOR SYSTEMS HAVING AUDIBLE CAR-DIRECTION SIGNALS

Filed Sept. 14, 1956 3 Sheets-Sheet 2

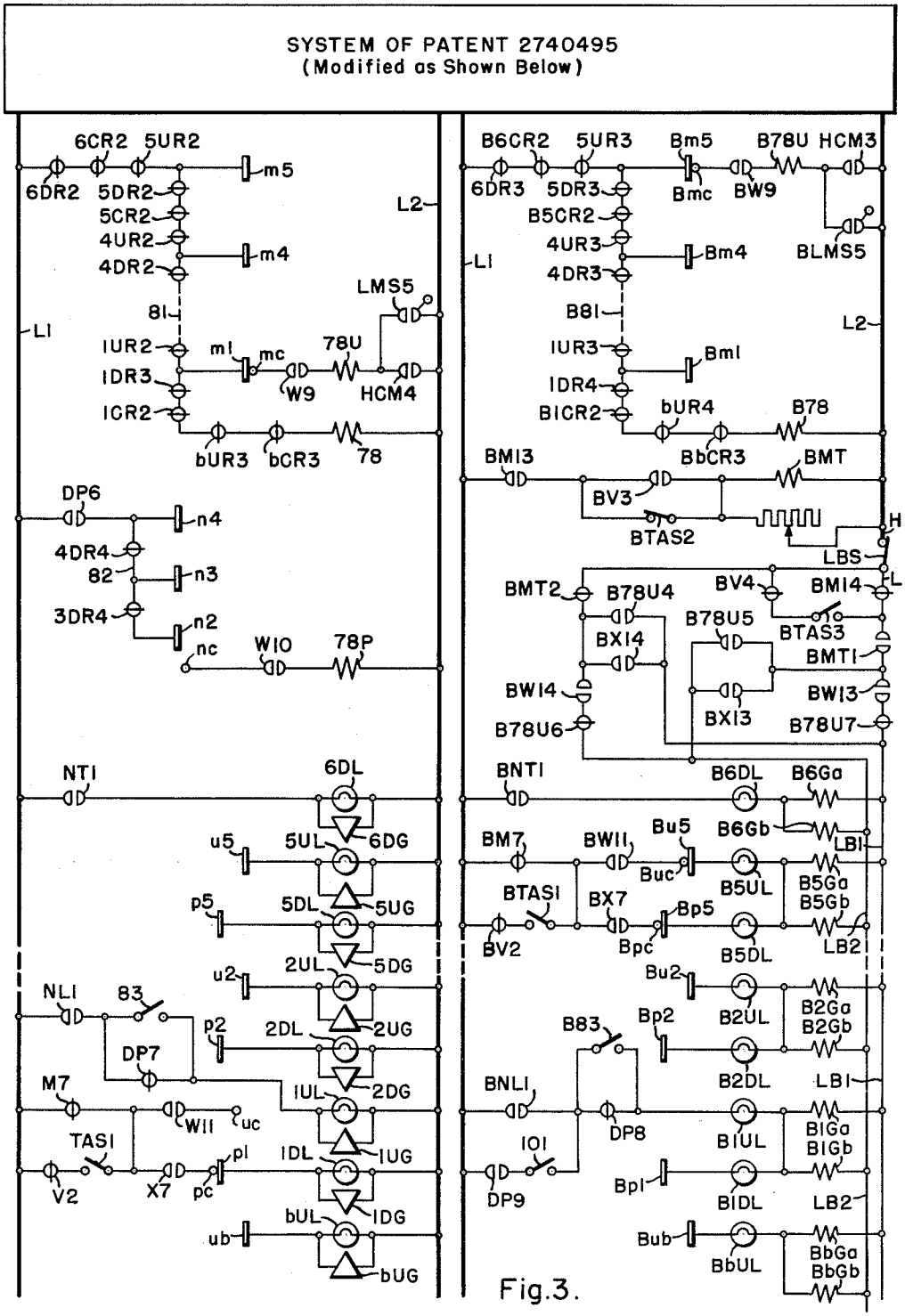



Fig.3.

ELEVATOR SYSTEMS HAVING AUDIBLE CAR-DIRECTION SIGNALS

Filed Sept. 14, 1956 3 Sheets-Sheet 3

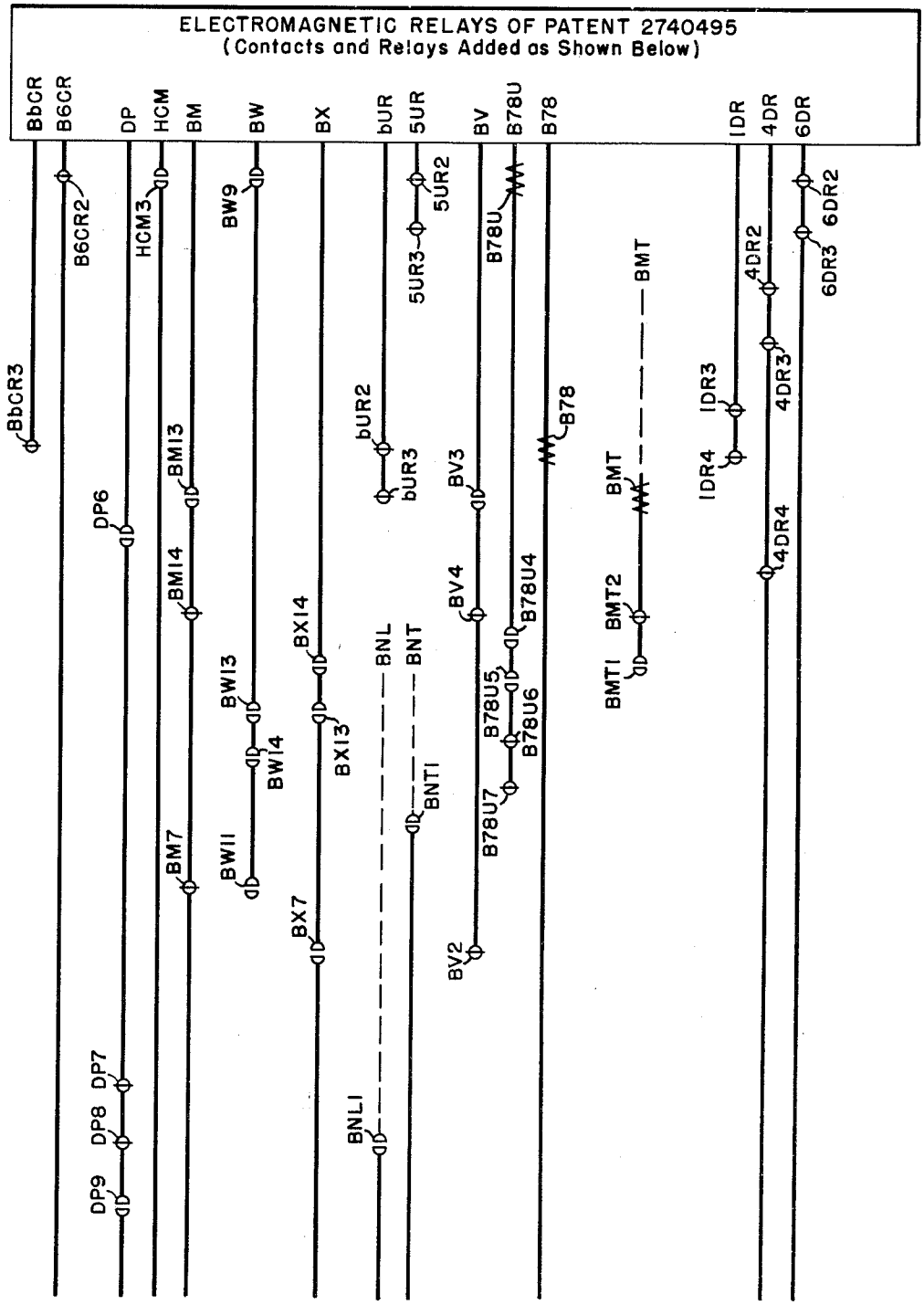



Fig.3A.

United States Patent Office 2,980,886 Patented Apr. 18, 1961



2,980,886

# ELEVATOR SYSTEMS HAVING AUDIBLE CAR-DIRECTION SIGNALS

Glen E. Yeakley, Westfield, N.J., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Filed Sept. 14, 1956, Ser. No. 609,846

10 Claims. (Cl. 340—19)

This invention relates to elevator systems having signals and has particular relation to elevator systems employing mechanism for indicating audibly the direction of movement of the elevator cars.

Although the invention may be employed in elevator systems wherein an elevator car attendant supervises the operation of each elevator car, the invention is particularly suitable for elevator systems of the automatic type wherein elevator car attendants are not employed. For this reason, the invention will be discussed with particular relation to an automatic elevator system.

In accordance with the invention, an elevator system is provided with sound generating mechanism capable of producing sound having characteristics indicative of the direction of travel of an elevator car. Thus, the sound generating mechanism may have a tonal output which ascends in pitch for the purpose of indicating upward travel of an elevator car. The sound generating mechanism may produce a tonal output descending in pitch for the purpose of indicating downward travel of an elevator car.

Although a continuous variation in pitch may be employed, in a preferred embodiment of the invention two or more discrete tones are produced in sequence for the purpose of indicating direction of travel of an elevator car. Thus, a tone of low pitch followed rapidly by a tone of high pitch may indicate upward travel of the elevator car, whereas a tone of high pitch followed rapidly by a tone of low pitch may indicate downward travel of an elevator car.

Preferably, the sequence of tones is produced as an elevator car stops at an intermediate floor for the purpose of indicating the direction in which the elevator car is to leave the floor.

The audible signals herein discussed may be employed alone for indicating the direction of travel of an elevator car. Desirably, however, the audible signals are combined with visual signals, such as conventional floor lanterns, for the purpose of providing both audible and visual signals. This is particularly desirable for elevator cars arranged in banks.

The field of vision to which a normal prospective passenger is sensitive is restricted to a field in front of the passenger. However, a normal prospective passenger is sensitive to audible signals which reach him from virtually any direction. Thus, a prospective passenger who is looking away from a floor lantern may be alerted by an audible signal originating adjacent such floor lantern. When so alerted, the prospective passenger can determine the specific elevator car which will serve him by inspection of the floor lantern associated with such car.

It is, therefore, an object of the invention to provide an elevator system having improved audible signals for indicating direction of travel of the elevator car.

It is another object of the invention to provide an elevator system with improved audible and visual signals for indicating the direction of travel of an elevator car.



It is a further object of the invention to provide an elevator system wherein a sequence of tones having different pitches is employed for indicating direction of travel of an elevator car.

It is also an object of the invention to provide an elevator system wherein an audible signal having an ascending pitch indicates upward travel of an elevator car.

It is an additional object of the invention to provide an elevator system wherein an audible signal of descending pitch indicates downward travel of an elevator car.

Other objects of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a view in elevation with parts broken away of an elevator system embodying the invention;

Fig. 2 is a view in elevation with parts broken away of an elevator car suitable for the system of Fig. 1;

Fig. 3 is a schematic view in straight line form showing control circuits suitable for the elevator system of Fig. 1; and

Fig. 3A is a key representation of electromagnetic relays employed in the circuits of Fig. 3. If Figs. 3 and 3A are placed in horizontal alignment, it will be found that corresponding coils and contacts, shown in the two figures, are in horizontal alignment.

In order to simplify the presentation of the invention, it will be assumed that the invention is applied to an elevator system similar to that shown in Figs. 1 to 8 of the Santini et al. Patent 2,740,495, which issued April 3, 1956. Insofar as possible, the reference characters and conventions employed in this patent will be employed in the following discussion.

## FIG. 1

Fig. 1 of the present drawings is identical to Fig. 1 of the aforesaid Santini et al. patent except for the addition to such patent of gong units and gongs. In order to facilitate an understanding of the invention, the following tabulation of components is presented.

*Apparatus in Fig. 1 for Car A also shown in Patent 2,740,495*

**11**—Electric motor.
**12**—Shaft.
**13**—Traction sheave.
**14**—Brake drum.
**16**—Floor selector.
**20**—Counterweight.
**21**—Ropes.
LMS—Load measuring switch.
E—Inductor slowdown relay.
F—Inductor stopping relay.
UEP, DEP, UFP, DFP—Inductor plates.
*bc*, **1***c* to **6***c*—Car-call push buttons.
1UL—Up-floor lantern for first floor.
1DL—Down-floor lantern for first floor.
**37**—Door.

*Apparatus in Fig. 1 common to all cars also shown in Patent 2,740,495*

2U—Up-floor push button for second floor.
2D—Down-floor push button for second floor.

*Apparatus in Fig. 1 not shown in Patent 2,740,495*

I. FOR ELEVATOR CAR A

1UG—Up-direction gong unit for first floor.
1DG—Down-direction gong unit for first floor.

II. FOR ELEVATOR CAR B

B5G*a*—Low-pitch gong for fifth floor.
B5G*b*—High-pitch gong for fifth floor.

A single up-direction gong unit and a single down-direction gong unit could be mounted on the elevator car A and the appropriate gong unit could be sounded as the elevator car stops at each floor shortly after the door of the car starts to open. However, in a preferred embodiment of the invention, separate gong units are provided at each of the floors served by the elevator car. Thus, an up-direction gong unit is provided at each floor from which the elevator car may leave in the up direction, whereas a down-direction gong unit is provided at each floor from which the elevator car may leave in the down direction.

The aforesaid Santini et al. patent describes an elevator system employing four elevator cars. Gong units similar to those illustrated for the elevator car A may be employed for each of the elevator cars of the system. However, for illustrative purposes, it will be assumed that each floor served by the elevator car B is provided with a low-pitch gong and a high-pitch gong, such as the gongs B5G*a* and B5G*b* for the fifth floor. Similar gongs may be employed for each of the elevator cars of the system.

FIG. 2

Fig. 2 is similar to Fig. 2 of the aforesaid Santini et al. patent. For this reason, no detailed discussion thereof is here required.

FIG. 3

Fig. 3 is intended to show a control system similar to that represented in Figs. 3 to 8, inclusive, of the aforesaid Santini patent with certain additions which are illustrated in detail. Since the present control system is largely a duplicate of that in the aforesaid Santini et al. patent, only so much of the system is shown in detail in Fig. 3 as is necessary to illustrate the additions to the system of the patent.

In order to facilitate a consideration of Fig. 3, the following tabulation of components shown in the figure is set forth.

*Apparatus in Fig. 3 for Car A also shown in Patent 2,740,495*

78U—High-call relay.
78—No-call relay.
78P—Low-zone high-call relay.
*b*UL, 1UL to 5UL—Up-floor lanterns for basement and first to fifth floors.
1DL to 6DL—Down-floor lanterns for first to sixth floors.
L1, L2—Buses connected to source of direct current.

*Apparatus in Fig. 3 not shown in Patent 2,740,495*

I. FOR ELEVATOR CAR A

*b*UG, 1UG to 5UG—Up-direction gong units for basement and first to fifth floors.
1DG to 6DG—Down-direction gong units for first to sixth floors.
V2—Break contacts added to speed relay V of Patent 2,740,495.

II. FOR ELEVATOR CAR B

BMT—Gong-timing relay.
BV2, BV3, BV4—Contacts added to speed relay BV of Patent 2,740,495.
BM13, BM14—Contacts added to running relay BM of Patent 2,740,495.
BX13, BX14—Contacts added to down-direction relay BX of Patent 2,740,495.
BW13, BW14—Contacts added to up-direction relay BW of Patent 2,740,495.
B78U4, B78U5, B78U6, B78U7—Contacts added to high-call relay B78U of Patent 2,740,495.



B*b*G*a*, B1G*a* to B6G*a*—Low pitch gongs for basement and first to sixth floors.
B*b*G*b*, B1G*b* to B6G*b*—High pitch gongs for basement and first to sixth floors.

The circuits associated with the elevator car A now will be considered. If the manually-operated switch TAS1 of Fig. 3 is open, the circuits controlling the elevator car A are identical with those of the aforesaid Santini et al. patent except for the addition of a separate gong unit for each of the floor lanterns. Thus, the up-direction gong units *b*UG, 1UG to 5UG are associated respectively with the floor lanterns *b*UL and 1UL to 5UL. Each gong unit is connected to be energized at the same time as its associated floor lantern. To this end, each of the gong units may be connected in series or in parallel with its associated floor lantern. The parallel connection is illustrated in Fig. 3. In a similar manner, the down-direction gong units 1DG to 6DG are associated respectively with the floor lanterns 1DL to 6DL.

When energized each of the up-direction gong units is designed to produce a succession of tones of ascending pitch. For example, each of these units when energized may produce a tone of low pitch followed at a suitable interval, such as one-fourth of a second, by a tone of higher pitch. Units of this type for producing a succession of tones are well known and are extensively employed, for example, as door chimes in residences.

In an analogous manner, each of the down-direction gong units is intended to produce successive tones of descending pitch. Thus, each of the units may provide a first tone of high pitch followed at a suitable interval, such as one-fourth of a second, by a tone of low pitch. When energized, each of the gong units may be arranged to produce its sequence of two tones only once. Alternatively, each gong unit may be arranged to repeat the sequence at intervals during the energization of the unit. Each of the units may be located at its proper floor adjacent its associated floor lantern.

The operation of the gong units associated with the elevator car A now will be considered. As clearly described in the aforesaid Santini et al. patent, as the elevator car A stops at each intermediate or basement floor or as the elevator car A is selected by the dispatcher as the next car to leave a terminal floor, the appropriate floor lantern is illuminated to indicate the direction in which the elevator car will leave the floor at which it is stopped. At the same time, the proper gong unit is energized to produce an audible signal indicating the direction of departure of the elevator car.

Let it be assumed that the elevator car A is traveling up towards the fifth floor and that it has a call requiring it to stop at the fifth floor. Under such circumstances, the make contacts W11 of the up-direction relay are closed. As the elevator car nears the fifth floor, the brush *uc* engages the contact segment *u*5 to prepare the floor lantern 5UL and the gong unit 5UG for subsequent energization. As the elevator car stops at the fifth floor, the break contacts M7 close to complete the following circuit:

L1, M7, W11, *uc*, *u*5, 5UL and 5UG in parallel, L2

The floor lantern 5UL now is energized to indicate that the elevator car will leave the fifth floor in the up direction. In addition, the gong unit 5UG is energized to sound a first tone of low pitch followed at a brief interval, such as one-fourth second, by a tone of high pitch to indicate audibly that the elevator car will leave the fifth floor in the up direction.

Let it be assumed next that the elevator car A is leaving the sixth floor in the down direction and that it is to stop at the fifth floor. Under such circumstances, the make contacts X7 of the down-direction relay X are closed. As the elevator car nears the fifth floor, the brush *pc* engages the contact segment *p*5. As the eleva-

tor car stops at the fifth floor, the break contacts M7 close to complete the following circuit:

L1, M7, X7, *pc*, *p*5, 5DL and 5DG in parallel, L2

The floor lantern 5DL now is illuminated to indicate visually that the elevator car will leave the fifth floor in the down direction. In addition, the down-direction gong unit is energized to produce a first tone of high pitch followed at a suitable interval, such as one-fourth of a second, by a tone of low pitch to indicate audibly that the elevator car will leave in the down direction. Thus, at each floor, a prospective passenger is alerted audibly to the fact that an elevator car stopping at the floor will leave the floor in a certain direction. In addition, the prospective passenger has a visual signal indicating the direction of departure of the car.

As shown in the aforesaid Santini et al. patent, the break contacts M7 close to operate a floor lantern as the elevator car completes a stopping operation at an intermediate floor. If an earlier operation of a floor lantern and its associated gong unit is desired, the manually-operated switch TAS1 may be closed to connect break contacts V2 of the speed relay V across the break contacts M7.

While the elevator car A is running between floors, the break contacts M7 and V2 are open. If the elevator car A is to stop at an intermediate floor, the speed relay V is deenergized and the break contacts V2 of the speed relay close when the elevator car reaches its slowdown distance from the floor. This operation of the speed relay is set forth in the aforesaid Santini et al. patent. Consequently, the closure of the break contacts V2 operates the floor lantern and the gong unit for the intermediate floor at which the elevator car is to stop appreciably before completion of the stopping operation.

Circuits similar to those employed for operating the floor lanterns and gong units associated with the elevator car A may be employed for each of the elevator cars in the bank. However, different circuits are illustrated for the elevator car B, and these now will be described.

It will be assumed that the manually-operated switches BTAS2 and LBS are closed and that the manually-operated switches BTAS3 and BTAS1 are open. Under such circumstances when the elevator car B is running between floors, the gong timing relay BMT is energized through the make contacts BM13. As the elevator car B stops at a floor, the make contacts BM13 open and the relay BMT starts a timing-out operation. This relay may have a time delay in dropout determined by an adjustable resistor connected thereacross which may be of the order of one-fourth of a second.

The floor lanterns B*b*UL, B1UL, to B5UL and B1DL to B6DL, each has a terminal connected selectively to the bus L1 in the manner discussed in the aforesaid Santini et al. patent. The remaining terminals of the two up and down floor lanterns for each floor are connected together and are also connected through a low pitch gong to a conductor LB1 and through a high pitch gong to a conductor LB2. For example for the fifth floor, the right-hand terminals of the lanterns B5UL and B5DL are connected together. In addition, these terminals are connected through the low pitch gong B5G*a* to the conductor LB1 and through the high pitch gong B5G*b* to the conductor LB2. In a similar manner, the lanterns B2UL and B2DL are connected through the gongs B2G*a* and B2G*b*, respectively, to the conductors LB1 and LB2. The lanterns B1UL and B1DL are connected through the gongs B1G*a* and B1G*b*, respectively, to the conductors LB1 and LB2. Similar connections for the lanterns are employed for each of the intermediate floors.

The single lantern B6DL for the upper terminal floor has its right-hand terminal connected through low and high pitch gongs B6G*a* and B6G*b*, respectively, to the conductors LB1 and LB2. Also, the right-hand terminal of the single lantern B*b*UL for the basement floor is connected through low pitch and high pitch gongs B*b*G*a* and B*b*G*b*, respectively, to the buses LB1 and LB2.

The conductors LB1 and LB2 are connected successively to the bus L2 in an order dependent on the direction in which the elevator car B is to leave a floor at which it is stopping. Thus, if the elevator car B is to leave in the up direction, the conductor LB1 is connected to the bus L2 in advance of the connection of the conductor LB2 in order to energize a low pitch gong in advance of a high pitch gong for the desired floor. Conversely, if the elevator car is to leave a floor at which it is stopping in the down direction, the conductor LB2 is conected to the bus L2 in advance of the conductor LB1 to energize the high pitch gong in advance of the low pitch gong for the floor at which the elevator car is to stop.

The conductor LB1 may be connected to the bus L2 through either of two circuits. One of the circuits includes the break contacts B78U7, the make contacts BW13, the make contacts BMT1, the break contacts BM14 and the switch LBS in series. The second circuit includes the make contacts B78U4 and BX14 in parallel, the break contacts BMT2 and the switch LBS. In a similar manner, the conductor LB2 may be connected to the bus L2 through a circuit including the break contacts B78U6, the make contacts BW14, the break contacts BMT2 and the switch LBS. A second circuit is provided through the make contacts B78U5 and BX13 in parallel, the make contacts BMT1, the break contacts BM14 and the switch LBS.

The operation of 2 gongs associated with the elevator car B now will be considered. It will be assumed first that the elevator car B is proceeding upwardly and that it is to stop at the fifth floor. Under such circumstances, the make contacts BW11 of the up-direction relay are closed, whereas the break contacts BM7 of the running relay are open. In addition, the make contacts BM13 are closed and the gong timing relay BMT consequently is energized and picked up. Therefore, the make contacts BMT1 are closed, whereas the break contacts BMT2 are open. In addition, the break contacts BM14 are open, whereas the make contacts BW13 and BW14 are closed.

The elevator car B now stops at the fifth floor in the manner discussed in the aforesaid Santini et al. patent. During the stopping operation, the brush B*uc* is in engagement with the contact segment B*u*5. As the elevator car completes its stopping operation, the break contacts BM7 and BM14 close to complete the following circuit:

L1, BM7, BW11, B*uc*, B*u*5, B5UL, B5G*a*, LB1, B78U7, BW13, BMT1, BM14, LBS, L2

Consequently, the floor lantern B5UL now is energized to indicate that the elevator car B will leave the fifth floor in the up direction. In addition, the gong B5G*a* is energized to produce a tone having a low pitch.

At the same time, the make contacts BM13 open to deenergize the gong timing relay BMT, and this relay starts to time out. At the end of a suitable time, such as one-fourth second, the relay BMT drops out to open its make contacts BMT1 which deenergizes the energizing circuit for the gong B5G*a*. At the same time, the break contacts BMT2 close to complete the following circuit:

L1, BM7, BW11, B*uc*, B*u*5, B5UL, B5G*b*, LB2, B78U6, BW14, BMT2, LBS, L2

Consequently, the lantern B5UL1 is promptly reenergized and the high pitch gong B5G*b* is energized to produce a tone having a high pitch. The low pitch tone followed in one-fourth second by a high pitch tone indicates by its ascending pitch that the elevator car B will leave the fifth floor in the up direction. As the elevator car leaves the floor, the contacts BM7 open to deenergize the floor lantern B5UL and the gong B5G*b*. In addition, the make

contacts BM13 close to reenergize and pick up the gong timing relays BMT, and the latter opens its break contacts BMT2 and closes its make contacts BMT1 to complete the resetting operation.

It will be assumed next that the elevator car B is leaving the sixth floor and that it is to stop at the fifth floor. Under such circumstances, the make contacts BM13 are closed and the gong timing relay BMT is energized and picked up. The make contacts BMT1 are closed and the break contacts BMT2 are open. Inasmuch as the elevator car is set for down travel, the make contacts BX7, BX13 and BX14 of the down-direction relay are closed. Also, break contacts BM7 and BM14 are open.

As the elevator car approaches the fifth floor, it stops by the sequence discussed in the aforesaid Santini et al. patent. As the car completes its stopping operation, the break contacts BM7 and BM14 close to complete the following circuit:

L1, BM7, BX7, B*pc*, B*p*5, B5DL,
B5G*b*, BX13, BMT1, BM14, LBS, L2

Consequently, the floor lantern B5DL now is illuminated to indicate visually that the elevator car B will leave the fifth floor in the down direction. In addition, the high pitch gong B5G*b* is energized to produce a high pitch tone.

At the same time, the make contacts BM13 open to start a timing-out operation of the gong timing relay BMT. At the end of a suitable time interval, such as one-fourth of a second, the relay BMT drops out, opening its make contacts BMT1. This deenergizes the floor lantern B5DL and the gong B5G*b*. At the same time, the break contacts BM2 close to complete the following circuit:

L1, BM7, BX7, B*pc*, B*p*5, B5DL,
B5G*a*, LB1, BX14, BMT2, LBS, L2

Consequently, the floor lantern B5DL is promptly reenergized and the gong B5G*a* is energized to produce a low pitch tone. The high pitch tone followed in one-fourth second by the low pitch tone indicates by its descending pitch that the elevator car B will leave the fifth floor in the down direction. As the elevator car starts from the fifth floor, the break contacts BM7 open to deenergize the floor lantern and the associated gong. The make contacts BM13 close to reenergize the gong timing relay BMT, and the break contacts BM14 open. The reenergized relay BMT closes its make contact BMT1 and opens its break contacts BMT2 to complete the resetting operation.

Let it be assumed next that the elevator car B is traveling up and is to reverse at its highest call which is assumed to be at the fifth floor. Under these circumstances, the make contacts 78U5 of the high-call relay are closed, whereas the break contacts B78U6 and B78U7 are open. The conditions of the remaining contacts will be understood from the preceding discussion of the stopping of the elevator car B at the fifth floor.

As the elevator car B stops at the fifth floor, the dropout of the running relay is accompanied by a dropout of the up-direction relay and pickup of the down-direction relay in the manner described in the aforesaid Santini et al. patent. Consequently, the make contacts BW13, BW14 and BW11 all open, whereas the make contacts BX14, BX13 and BX7 all close.

As the car stops, the closure of the break contacts BM7 and BM14 of the running relay now completes the following circuit:

L1, BM7, BX7, B*pc*, B*p*5, B5DL, B5G*b*,
LB2, 78U5, BMT1, BM14, LBS, L2

Consequently, the down lantern B5DL is illuminated to indicate that the elevator car will leave the fifth floor in the down direction. In addition, the energized high pitch gong B5G*b* produces a tone of high pitch.

The dropout of the running relay also resulted in opening of the make contacts BM13 to deenergize the gong timing relay BMT. At the end of its time delay of one-fourth second, this relay drops out to open its make contacts BMT1. This deenergizes the lantern B5DL and the gong B5G*b*. In addition, the break contacts BMT2 close to complete the following circuit:

L1, BM7, BX7, B*pc*, B*p*5, B5DL,
B5G*a*, LB1, B78U4, BMT2, LBS, L2

Consequently, the down lantern is properly reenergized, and the low pitch gong B5G*a* produces a tone. The high pitch tone followed in one-fourth second by the low pitch tone indicates that the elevator car B will leave the fifth floor in the down direction.

With the operation thus far described, a lantern is illuminated and the gongs are sounded substantially as the elevator car comes to a stop. If earlier operation of the lanterns and gongs is desired, the switch BTAS2 may be opened and the switches BTAS1 and BTAS3 may be closed. With the switches so operated, let it be assumed that the elevator car B is traveling up and that it is to stop at the fifth floor before proceeding to the sixth floor. As the elevator car B reaches its slowdown distance from the fifth floor, the speed relay drops out to close its break contacts BV2 and BV4. This completes the following circuit:

L1, BV2, BTAS1, BW11, B*uc*,
B*u*5, B5UL B5G*a* LB1, B78U7,
BW13, BMT1, BTAS3, BV4, LBS, L2

Consequently, the up-floor lantern 5BUL and the gong B5G*a* are energized substantially before the elevator car B completes its stopping operation.

At the same time, the make contacts BV3 open to deenergize the gong timing relay BMT which now starts to time out. At the end of one-fourth of a second, the relay BMT drops out to discontinue the energization of the gong B5G*a* and to energize the gong B5G*b* in the manner previously discussed. Consequently, the effect of the contacts BV2, BV3 and BV4 is to give the visual and the audible signals to prospective passengers at a floor substantially before the elevator car arrives at the floor. If desired, the floor lantern and gong control for each of the elevator cars may be similar to that illustrated for the elevator car B.

Although the invention has been described with reference to certain specific embodiments thereof, numerous modifications falling within the spirit and scope of the invention are possible.

I claim as my invention:

1. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, control means operable for stopping the elevator car at selected floors and for starting the elevator car from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which the elevator car will leave the floor, said audible signal means comprising sound generating mechanism operable for generating a first gong sound and a second gong sound succeeding said first sound, the complete second sound being higher in pitch than the complete first sound generated by the generating mechanism and operating means responsive to each stopping operation of the elevator car at one of the floors from which the elevator car is to start in the up direction for operating the sound generating mechanism to produce successively said first and second sounds, said operating means being ineffective for operating the sound generating means to produce successively said first and second sounds when the elevator car is to start in the down direction, said sound generating mechanism comprising a first gong unit for producing said first sound and a second gong unit for producing said second sound.

2. In an elevator system, a structure having a plural-

ity of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, control means operable for stopping the elevator car at selected floors and for starting the elevator car from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which the elevator car will leave the floor, said audible signal means comprising sound generating mechanism operable for generating a first gong sound and a second gong sound succeeding said first sound, the complete second sound being lower in pitch than the complete first sound generated by the generating mechanism and operating means responsive to each stopping operation of the elevator car at one of the floors from which the elevator car is to start in the down direction for operating the sound generating mechanism to produce said successive first and second sounds, said operating means being ineffective for operating the sound generating means to produce successively said first and second sounds when the elevator car is to start in the up direction, said sound generating mechanism comprising a first gong unit for producing said first sound and a second gong unit for producing said second sound.

3. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, direction means for determining the direction in which the elevator car will leave a floor, audible signal means comprising gong sound generating mechanism at each of said floors having a first operating condition for producing a first gong sound followed by a second gong sound, the complete second sound being higher in pitch than the complete first sound produced by said generating mechanism to signal up travel of the elevator car and a second operating condition for producing a first gong sound followed by a second gong sound, the complete second sound being lower in pitch than the complete first sound produced by said generating mechanism for the second operating condition to signal down travel of the elevator car, and means responsive to said direction means and to the position of the elevator car for selecting the operating condition of the sound generating mechanism corresponding to the direction of travel of the elevator car and located at a floor at which the elevator car is set to stop.

4. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, control means operable for stopping the elevator car at selected floors and for starting the elevator car from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which the elevator car will leave the floor, said audible signal means comprising sound generating mechanism operable for generating an inarticulate sound free of language meaning and having first and second components which occur in succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, and operating means responsive to each stopping operation of the elevator car at one of the floors from which the elevator car is set to start in the up direction for operating the sound generating mechanism to produce said sound with said first component earliest in said succession and said second component latest in said succession, said operating means being ineffective for operating the sound generating means to produce said sound with said first component earliest and said second component latest in said succession when the elevator car is set to start in the down direction.

5. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, control means operable for stopping the elevator car at selected floors and for starting the elevator car from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which the elevator car will leave the floor, said audible signal means comprising sound generating mechanism operable for generating an inarticulate sound free of language meaning and having first and second components which occur in a succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, and operating means responsive to said stopping operation of the elevator car at one of the floors from which the elevator car is set to start in the down direction for operating the sound generating mechanism to produce said sound with said second component earliest in said succession and said first component latest in said succession, said operating means being ineffective for operating the sound generating means to produce said sound with said second component earliest in said succession and said first component latest in said succession when the elevator car is set to start in the up direction.

6. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, control means operable for stopping the elevator car at selected floors and for starting the elevator car from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which the elevator car will leave the floor, said audible signal means comprising sound generating mechanism operable for generating an inarticulate sound free of language meaning and having first and second components which occur in a succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, said sound generating mechanism having a first operation in which said first component occurs earliest in said succession and said second component latest in said succession and a second operation in which said second component occurs earliest in said succession and said first component occurs latest in said succession, and operating means responsive to each stopping operation of the elevator car at one of the floors from which the elevator car is to start in the up direction for operating the sound generating mechanism only with the first of said operations, said operating means being responsive to each stopping operation of the elevator car at one of the floors from which the elevator car is to start in the down direction for operating the sound generating mechanism only with the second of said operations.

7. In an elevator system, a structure having a plurality of floors, a plurality of elevator cars, means mounting the elevator cars for movement relative to the structure in up and down directions to serve the floors, control means operable for each of the elevator cars at selected floors and for starting each of the elevator cars from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which one of the elevator cars will leave the floor, said audible signal means comprising sound generating mechanism operable for generating an inarticulate sound free of language meaning and having first and second components which occur in a succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, and having a first operation in which said first component occurs earliest in said succession and said second component occurs latest in said succession and a second operation in which said second component occurs earliest in said succession and first component occurs latest in said succession, an up visual signal and a down visual signal for each of said elevator cars at each of the floors, each of said visual signals being op-

erable to indicate the direction of departure of the associated elevator car when such car is stopped at the associated floor, and operating means responsive to each stopping operation of one of the elevator cars at one of the floors from which the last-named elevator car is to start in the up direction for operating the sound generating mechanism in said first operation and for operating the associated up visual signal at such floor, said operating means being responsive to each stopping operation of one of the elevator cars at one of the floors from which the last-named elevator car is to start in a down direction for operating the sound generating means in said second operation and for operating the associated down visual signal.

8. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, direction means for determining the direction in which the elevator car will leave a floor, audible signal means comprising sound generating mechanism operable for generating an inarticulate sound free of language meaning and having first and second components which occur in a succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, selective means connected to said generating mechanism for producing said sound with said first component earlier in said succession and said second component latest in said succession to signal up travel of the elevator car and for producing said second component earliest in said succession and said first component latest in said succession to signal down travel of the elevator car, and means responsive to said direction means and connected to said selective means for causing said selective means to operate said sound generating mechanism corresponding to the direction of travel of the elevator car.

9. In an elevator system, a structure having a plurality of floors, an elevator car, means mounting the elevator car for movement relative to the structure in up and down directions to serve the floors, direction means for determining the direction in which the elevator car will leave a floor, audible signal means comprising sound generating mechanism at each of said floors operable for generating an inarticulate sound free of language meaning and having first and second components which occur in a succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, said sound generating means having a first operating condition in which said first component occurs earliest in said succession and said second component occurs latest in said succession to signal up travel of the elevator car and a second operating condition in which said second component occurs earliest in said succession and said first component occurs latest in said succession to signal down travel of the elevator car, and means responsive to said direction means and to the position of the elevator car for selecting the operating condition of the sound generating mechanism corresponding to the direction of travel of the elevator car and located at a floor at which the elevator car is set to stop.

10. In an elevator system, a structure having a plurality of floors, a plurality of elevator cars, means mounting the elevator cars for movement relative to the structure in up and down directions to serve the floors, control means operable for stopping each of the elevator cars at selected floors and for starting each of the elevator cars from each floor at which the car stops, and audible signal means for audibly indicating at a floor the direction in which one of the elevator cars will leave the floor, said audible signal means comprising sound generating mechanism at each of said floors operable for generating an inarticulate sound free of language meaning and having first and second components which occur in a succession, said first component being clearly identifiable as of lower pitch and said second component being clearly identifiable as of higher pitch, said sound generating means having a first sound operation in which said first component is earliest in said succession and said second component is latest in said succession, said sound generating means having a second sound operation in which said second component is earliest in said succession and said first component is latest in said succession, an up visual signal and a down visual signal for each of said elevator cars at each of the floors, each of said visual signals being operable to indicate the direction of departure of the associated elevator car when such car is stopped at the associated floor, and operating means responsive to each stopping operation of one of the elevator cars at one of the floors from which the last-named elevator car is to start in the up direction for operating the sound generating mechanism for the last-named floor with the first of said sound operations and for operating the associated up visual signal at such floor, said operating means being responsive to each stopping operation of one of the elevator cars at one of the floors from which the last-named elevator car is to start in the down direction for operating the sound generating mechanism for the last-named floor with the second of said sound operations and for operating the associated down visual signal.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,374,944 | Mulvehill | Apr. 19, 1921 |
| 1,739,613 | Russey | Dec. 17, 1929 |
| 2,009,701 | Miles | July 30, 1935 |
| 2,220,979 | Swanson | Nov. 12, 1940 |
| 2,740,495 | Santini et al. | Apr. 3, 1956 |