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Iwatani et al.

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[54] **TAXIMETER**

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Nov. 24, 1971 Japan 46-94276

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[51] **Int. Cl.** **H03k 21/06**

[58] **Field of Search**....... 235/92 TC, 92 DN, 92 TE, 235/45, 30 R

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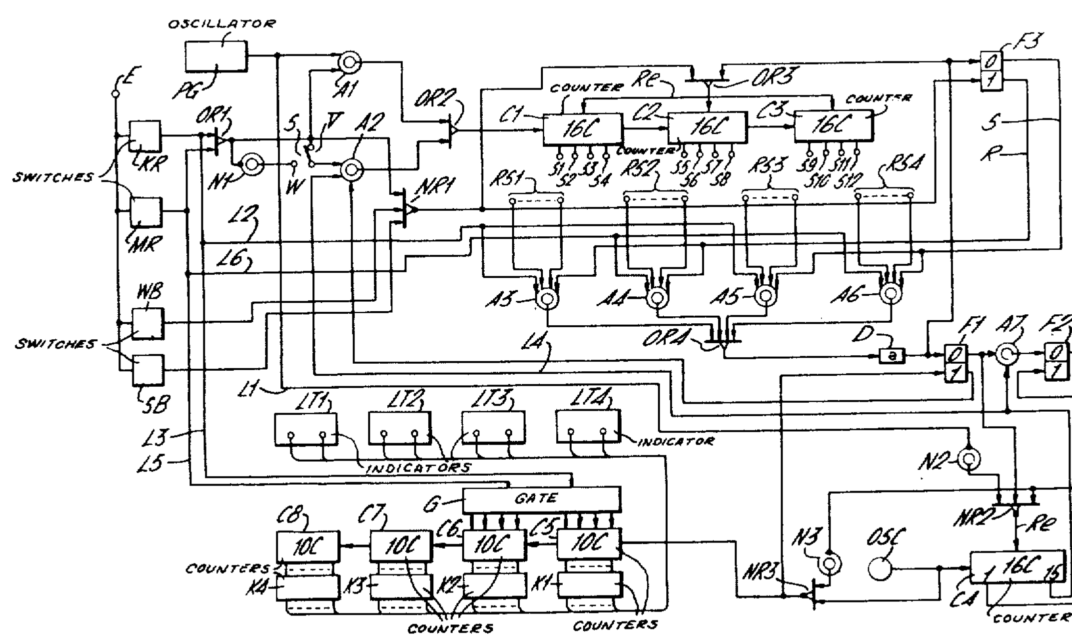
[57] **ABSTRACT**

Taximeter in which electrical pulses are used to calculate the fare to be paid. The fare to be paid comprises the basic fare for a predetermined basic distance and the additional fare for an additional distance traveled after the taxi has traveled the basic distance. The taximeter calculates the fare on the basis of distance traveled or time elapsed depending upon the speed of the taxi. The taximeter can easily be adapted selectively to different rates of calculation of the fare by simple changes of circuit connections.

18 Claims, 3 Drawing Figures



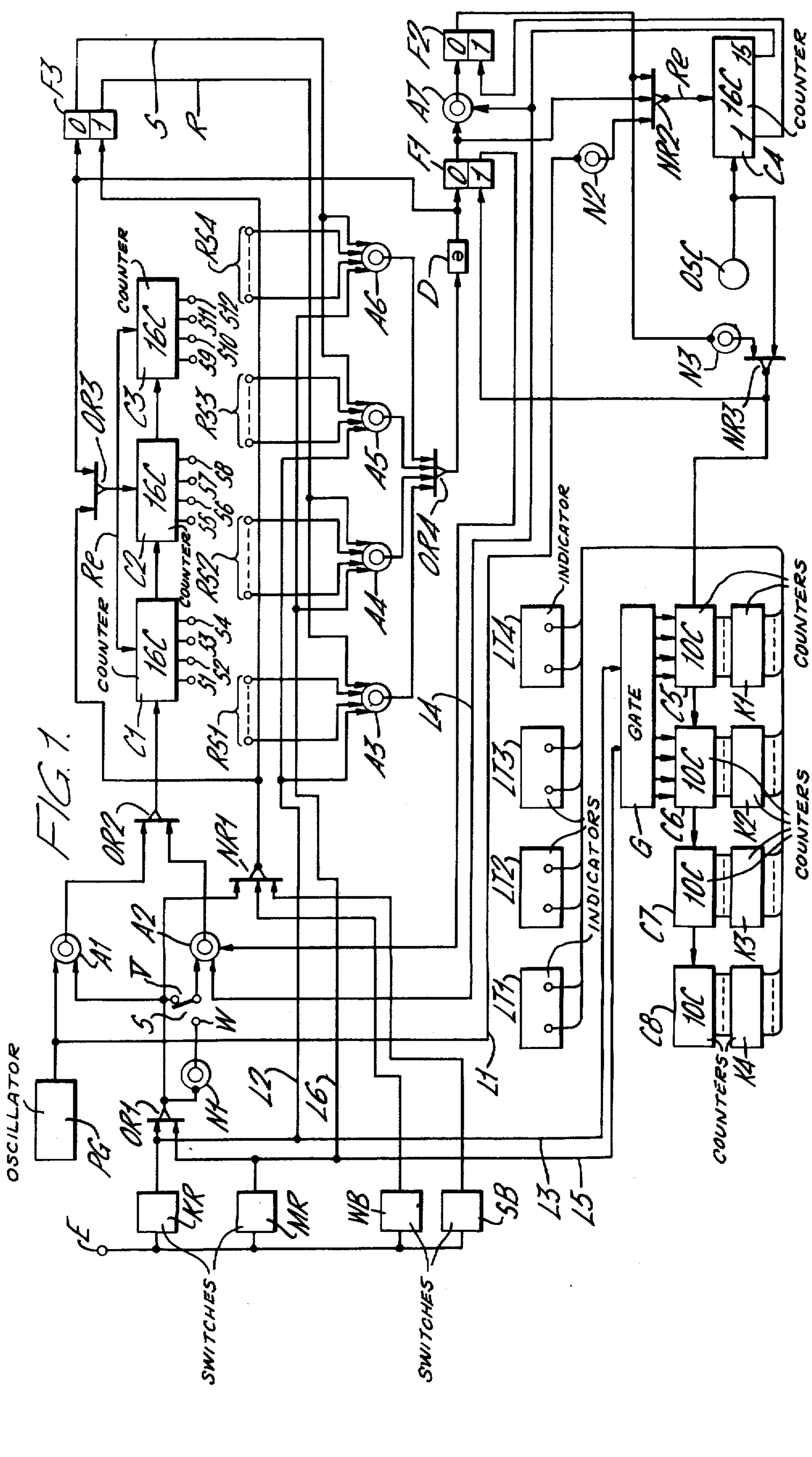

OSCILLATOR
PG
E
LKR
MR
WB
SB
SWITCHES
SWITCHES
OR1
N1
S
V
W
A1
A2
OR2
NR1
L1
L2
L3
L4
L5
L6
C1
C2
C3
16C
COUNTER
OR3
F3
RSI
RS2
RS3
RS4
A3
A4
A5
A6
OR4
D
F1
A7
F2
N2
N3
NR2
NR3
OSC
CA
COUNTER
LT1
LT2
LT3
LT4
INDICATOR
INDICATORS
GATE
G
C5
C6
C7
C8
10C
K1
K2
K3
K4
COUNTERS

FIG. 1.

FIG. 2.

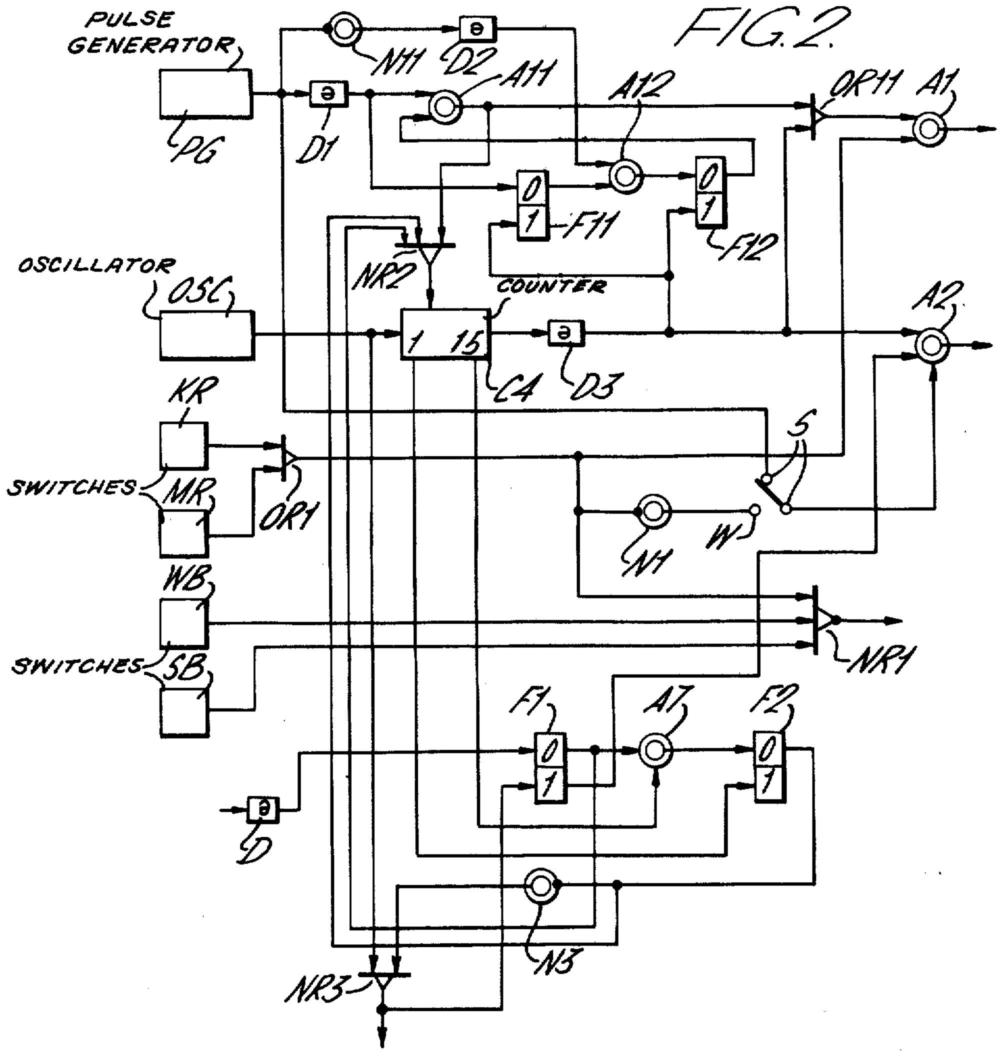
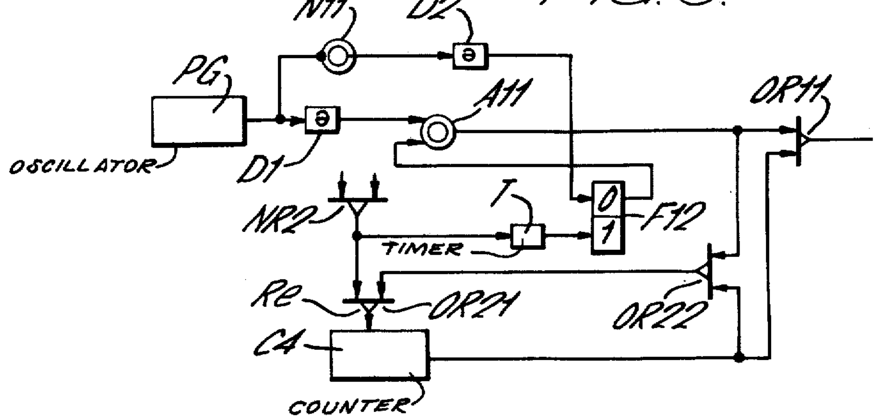

PULSE GENERATOR
PG
D1
N11
D2
A11
A12
OR11
A1
F11
F12
NR2
OSCILLATOR
OSC
COUNTER
1 15
C4
D3
A2
KR
SWITCHES
MR
OR1
S
N1
W
WB
SB
NR1
F1
A7
F2
D
N3
NR3

FIG. 3.


N11
D2
PG
OSCILLATOR
D1
A11
OR11
NR2
T
TIMER
F12
Re
OR21
OR22
C4
COUNTER

TAXIMETER

This invention relates to a taximeter and more particularly to a control system for calculation and indication of the fare by a taximeter.

In one known type of taximeter, the revolutions of the vehicle wheels are transferred through a suitable reduction gearing to the numeral wheels of a mechanical counter and indicator to count and indicate the fare to be paid by the passenger for the distance traveled by the taxi. The taximeters of this type employ a mechanical transmission comprising various mechanical moving parts or elements, especially gears, which are likely to wear, with resulting introduction of errors into calculation of fares. The taxi fare is sometimes revised, and the revision will require a corresponding change in the reduction gear ratio. To change the gear ratio, however, the gear wheels must be changed and the work requires considerable time and money.

Taxicabs are of different sizes or classes which request different fares, and the taximeter adapted for use in taxis of one size or class cannot be used in taxis of a different size or class so that as many types of meters as there are sizes of taxicabs must be provided, with resulting increase in the manufacturing cost of taximeters.

Accordingly, the primary object of this invention is to provide a taximeter which is electronically controlled.

Another object of this invention is to provide an electronically controlled taximeter, wherein electrical pulses are used to calculate the fare to be paid.

Another object of this invention is to provide an electronically controlled taximeter which calculates the fare to be paid on the distance and time basis. The distance and time basis means that the taxi fare is calculated on the basis of both the distance or miles traveled during a trip and the time elapsed for the trip. That is, when the taxi is running at a normal speed, the meter is advanced on the basis of distance or mileage, while when the vehicle is stopped or slowed down, say, in heavy traffic, the meter is advanced on the basis of time elapsed.

Another object of this invention is to provide an electronically controlled taximeter wherein there are provided two kinds of pulses, that is, pulses for distance fare and pulses for time fare, so that they are selectively counted in accordance with the traveling condition of the vehicle so as to calculate the fare to be paid.

Still another object of the invention is to provide a taximeter which can be easily adapted to different rates of calculation of the fare by a simple change of circuit connections.

The invention with its above and other objects, features and advantages will be clearly understood by the following detailed description of some preferred embodiments thereof with reference to the accompanying drawings, wherein:

FIG. 1 is an electrical block diagram of one embodiment of the invention;

FIG. 2 is a similar diagram showing a modification of a portion of FIG. 1; and

FIG. 3 is a similar diagram showing a modification of a portion of FIG. 2.

Generally, the taxi fare is a composite amount consisting of the basic fare and the additional fare. The basic fare is to be paid for a predetermined initial distance, say, 2 kilometers, from the start point of a trip.

If the distance of the trip is shorter than the basic distance, the basic fare must nevertheless be paid. The additional fare is the fare which is added to the basic fare for every predetermined unit additional distance, say, 420 meters over the basic distance. For travels in mountain regions or at midnight, the basic and additional fares are increased, or the distances covered by the basic and additional fares are shortened.

The above system of calculating the taxi fare is based on the distance traveled by the taxi. The time spent for the travel is also taken into consideration in the fare calculating system. In this case, if the vehicle speed has slowed down below a predetermined commercially payable speed due to say, traffic congestion, an additional fare which would have resulted from taxi travel at the predetermined speed during that time is added to the fare for each predetermined unit period of time.

For calculation of the taxi fare, it is necessary to accurately and smoothly conduct the required calculation. To this end, in accordance with this invention, there is provided a pulse generator which produces a predetermined number of "distance" pulses for every predetermined unit distance traveled by the vehicle. The distance pulses are counted by a distance pulse counter which produces an output when it has counted a predetermined number of distance pulses, and the output is used to calculate and indicate the fare to be paid. There are several counts which the "distance" pulse counter must reach to produce the output. These counts correspond to the normal basic fare, the normal additional fare and the increased basic fare and the increased additional fare for traveling in mountain regions or at midnight.

Another pulse generator produces a series of pulses having a fixed cycle. These pulses are counted by another pulse counter when the vehicle speed has become lower than a predetermined commercially payable speed. Whenever the counter has counted a predetermined number of the pulses, it produces an output, on the basis of which a "time" fare is calculated and added to the "distance" fare.

When the taxi fare is to be revised, it is only required to change the mode of connection of the output terminals of the distance pulse counter. The work is much simpler than the work required for exchange of gears or other mechanical elements.

Referring now in detail to the drawings, first to FIG. **1**, a pulse generator PG is actuated is response to the rotation of a wheel of a taxi to produce a unit number of "distance" pulses for every unit distance traveled by the vehicle. For example, the pulse generator produces **637** pulses for every **1** km traveled by the vehicle. The cycle of the pulses correspond to the vehicle speed. The distance pulses are applied as one input to an AND element **A1**, on the one hand, and through a line **L1**, a NOT element **N2** and a NOR element **NR2** as a reset input Re to a pulse counter **C4**, on the other hand.

There are provided four push-button switches KR, MR, WB, and SB, and when either one of the switches is pushed to closed position, the closed condition of the switch is maintained, and at the same time the other switches are reset to open position. The switch KR is closed for normal transport. The normal transport means that the taxi with a passenger thereon travels under normal conditions and not in the mountain regions nor at midnight. Under normal conditions, when a passenger gets on a taxi, the driver pushes the switch KR as he starts the vehicle.

When the switch KR is closed, the signal from a source terminal E is applied as one input to AND elements A3 and A5 through the switch KR and a line L2. The signal is also applied through a line L3 to a preset gate G, whcih presets values 1100 and 1000 in binary-coded decimal notation in counters C5 and C6, respectively. The counters C5 and C6 convert the binary codes to corresponding decimal numbers, which are applied to indicating tube driving circuits K1 and K2, respectively, so that the numerals 1 and 3 will be indicated on indicating tubes LT3 and LT4, respectively. Four tubes LT1–LT4 are arranged side by side for indication of the fare to be paid.

When the tubes are not actuated, they show the numeral 0 or no numeral at all. When actuated, however, the tubes indicate 13, which can be expressed as $ 1.3 with a point between the two numerals or as 130 yen with a fifth tube always indicating 0 placed at the right-hand side of the tube LT4. The value $ 1.3 or 130 yen indicates the basic fare for the basic distance. When the basic fare is to be changed, it is only necessary to simply change the reset values in the gate G.

The signal produced upon closure of the switch KR is applied as one input to AND elements A1 and A2 and a NOR element NR1 through an OR element OR1, whereupon the output of the NOR element becomes 0. Pulse counters C1–C3 receive as a reset input the output of the NOR element NR1, so that when the output of the NOR element NR1 becomes 0 as previously mentioned, the reset input is removed from the counters C1–C3, whereupon the pulses from the pulse generator PG are applied through the AND element A1 and an OR element OR2 to the counter C1. Each of the counters C1–C3 is a hexadecimal counter comprising a series combination of four bi-stable elements, the output terminals S1–S4, S5–S8, S9–S12 of which can be connected to exterior circuit elements. The terminals S1–S12 are selectively connectable to the terminals RS1–RS4. The signals applied to the latter terminals are applied to the inputs of AND elements A3, A4, A5 and A6.

When the counters C1–C3 have counted a predetermined number, say, 1274 pulses corresponding to the basic distance of 2 kilometers that has been travelled by the taxi, an output appears at the output terminals S2, S4, S5, S6, S7, S8 and S11. Therefore if these terminals are previously connected to the terminals RS1, all these latter terminals receive a signal when the counters C1–C3 have counted 1274 pulses.

A memory element F3 comprising a flip-flop is normally reset, with its reset output R being applied as one input to the AND elements A3 and A4, so that when the counters C1–C3 have counted 1274 pulses, the AND element A3 produces an output, which is applied through an OR element OR4 and a differentiator D to set memory flip-flops F1 and F3 and through an OR element OR3 to reset the counters C1–C3.

When the flip-flop F3 is set, its reset output and, consequently, the output of the AND element A3 disappear. The disappearance of these outputs means that the vehicle with the passenger thereon has now traveled the initial basic distance of 2 kilometers.

The set output S from the flip-flop F3 is applied as one input to AND elements A5 and A6. The set output of the flip-flop F1 causes the output of the NOR element NR2 to disappear thereby removing the reset input Re from a counter C4, which is also a hexadecimal counter, whereupon the counter C4 starts counting clock pulses supplied thereto from an oscillator OSC. When the counter C4 has counted 15 pulses, it produces an output on the fifteenth output terminal, which is applied through an AND element A7 to set a flip-flop F2. The set output of the flip-flop F2 is applied as one input to the NOR element NR2, so that no reset input is applied to the counter C4. The set output of the flip-flop F2 is also applied to a NOT element N3, the 0 output of which is then applied as one input to a NOR element NR3. The clock pulses from the oscillator OSC are also applied to the other input of the NOR element NR3. When the fifteenth clock pulse from the oscillator OSC has disappeared, the other input to the NOR element NR3 becomes 0, so that with the two inputs having become 0, the NOR element NR3 produces an output, which resets the flip-flop F1 on the one hand and is applied to the input of the counter C5 on the other hand.

When the oscillator produces a sixteenth clock pulse, the output of the NOR element NR3 becomes 0. This means that the counter C5 has now received one input pulse the width of which corresponds to the period from the time the fifteenth clock pulse from the oscillator OSC disappeared to the time the oscillator has produced the sixteenth clock pulse.

When the sixteenth pulse presently disappears, the NOR element NR3 again produces an output to be applied to the counter C5. The output has a pulse width corresponding to the time that will elapse till the seventeenth pulse is produced by the oscillator OSC.

When the seventeenth pulse is produced, the counter C4 produces an output at the first output terminal. This output resets the flip-flop F2, so that the set output thereof having become 0 is applied to the NOT element N3. As a result, the NOT element N3 produces an output 1 to be applied to the NOR element NR3, so that the output pulses from the oscillator OSC can no longer cause NOR element NR3 to produce an output to be applied to the counter C5. This condition continues till the counter C4 produces an output at the fifteenth output terminal at the next time.

As previously mentioned, when the flip-flop F2 is reset by the output on the first terminal of the counter C4, the set output of the flip-flop F2 having been rendered 0 is also applied to the NOR element NR2. Under this condition, when the pulse generator PG produces an output pulse, the pulse is applied through the line L1 to the NOT element N2, the output 0 of which is applied to the NOR element NR2, so that the element NR3 produces an output 1 to reset the counter C4.

As previously mentioned, as the counter C4 counts the sixteenth and seventeenth clock pulses from the oscillator OSC, the NOR element NR3 produces two pulses. These pulses are counted by the counters C5 and C6, and on the basis of the counts the indicator operating circuits K1 and K2 operate to change the indications on the indicator tubes LT3 and LT4 to, say, numerals 1 and 5, respectively. This means that the indication of the fare has been changed from 130 yen to 150 yen. This change of the indication has been resulted from the fact that the taxi has traveled the basic distance so that one unit fare of 20 yen has been added to the basic fare of 130 yen for a unit additional distance of 420 meters to be farther traveled by the taxi. Therefore, when the passenger gets off anywhere within the 420 meters over the basic 2 kilometers, he or she must pay **150** yen for the trip.

To the terminals RS3 are connected those of the output terminals of the counters C1–C3 at which an output appears when the counters C1–C3 have counted the number of pulses (say, 268 pulses) produced by the generator PG during the time the taxi travels one unit additional distance (420 meters). That is, the output terminals **S3, S4** and **S9** are connected to the terminals **RS3.** With this arrangement, when the taxi has traveled the basic distance of 2 kilometers and then one unit additional distance of 420 meters, a signal is applied through all of the terminals RS3 to the corresponding inputs of the AND element A5, to which the set output S of the flip-flop F3 has already been applied, so that the AND element A5 produces an output when the counters C1–C3 have counted 268 pulses. This output sets F1 and F3 through the OR element OR4 and the differentiator D on the one hand and resets the counters C1–C3 through the OR element OR3 on the other.

When the flip-flop F1 is set, two pulses are applied through the NOR element NR3 to the counter C5 in the same manner as when the basic distance was traveled, so that the indicator tubes LT3 and LT4 indicate the numerals 1 and 7, respectively. Now the fare has been raised to **170** yen. That is, when the taxi finished travel of the basic distance and one unit additional distance, the unit additional fare has been twice added to the basic fare. Likewise, every time one unit additional distance has been traveled, one unit additional fare is successively added to the fare accumulated until then.

Indication of the fare on the "time" basis will now be described. When the speed of the taxi with a pasenger thereon has become lower than a predetermined speed or zero, the pulse generator PG produces pulses of a longer cycle or no pulses at all. Every time the generator PG produces an output pulse to be applied through the line L1 to the NOT element **N2,** the output of the NOT element disappears thereby removing the reset input form the counter C4. However, when the speed of the taxi has become lower than the predetermined level, so that the time during which there is no output from the NOT element N2 has become longer than the time required for the counter C4 to count 15 pulses from the oscillator OSC, the counter C4 produces an output at the fifteenth output terminal. This output is applied through a line L4 to one input of the AND element **A2,** which then produces an output to be applied through the OR elememt OR2 to the counter C1. That is, every time the counter C4 has counted 16 pulses from the oscillator OSC, one pulse is applied to the counter C1. The output frequency of the oscillator OSC is so selected that if the speed of the taxi has been kept below a predetermined speed (that is, the minimum commercially payable speed) continuously for a predtermined period, say, 2 minutes and 30 seconds, 268 pulses are applied to the counter C1 during that time. The frequency of the output pulses from the oscillator that satisfies the above condition is 28 c/s.

When the counters C1–C3 have counted 268 pulses sent from the counter **C4,** the condition is quite the same as if the taxi had traveled 420 meters. To put it in other words, it is presupposed that it takes 2 minutes and 30 seconds for the taxi to travel 420 meters at a normal speed, and if the taxi has run for 2.5 minutes at a speed lower than the predetermined minimum payable speed, one unit additional fare is added to the fare calculated until then on the assumption that the taxi has run 420 meters although actually it has not.

When the counters C1–C3 have counted 268 pulses from the counter **C4, 20** yen is added to the indication on the tubes LT3 and LT4 in the same manner as in the previously mentioned case where the taxi has actually traveled one unit additional distance (420 meters).

When the taxi travels in the mountain regions or at midnight, the taxi driver presses the push-button switch MR, whereupon the signal at the source terminal E is applied through a line **L6** to the AND elements **A4** and **A6** on the one hand through a line **L5** to the preset gate G on the other, whereupon the gate G presents values 1010 and 1000 in binary-coded decimal notation in the counters C5 and **C6,** respectively, so that the indicator operating circuits K1 and K2 actuate the tubes LT3 and LT4 to indicate numerals 1 and 5, respectively. The increased basic fare of **150** yen has thus been indicated. When the taxi starts, the counters C1–C3 begin to count the pulses from the pulse generator PG in the same manner as previously mentioned.

Suppose that the basic distance that can be covered by the increased basic fare is 2.017 kilometers. The number of pulses from the generator PG which corresponds to the distance is 1285. The output terminals **S1, S3, S9** and **S11** of the counters C1–C3 are then connected to the terminals **RS2.** Suppose again that after the taxi has traveled the basic distance, an additional fare is added to the basic fare for every 350 meters the taxi farther travels. The number of pulses from the generator PG which corresponds to the additional distance of 350 meters is 223. The output terminals **S1, S2, S3, S4, S5, S7** and **S8** are then connected to the terminals **RS4.** With this arrangement, the operation of the system is substantially the same as when the taxi travels the normal basic distance and the normal additional distance. That is, when the taxi has traveled the basic distance of 2.017 kilometers, the fare changes from **150** yen to **170** yen, and thereafter **20** yen is added for every 350 meters traveled by the taxi. In this case, too, when the speed of the taxi has become lower than the predetermined level, a unit additional fare is added for lapse of every predetermined period of time.

When the taxi has reached the destination of the travel, the driver presses the push-button switch SB, whereupon the switch MR is reset to open position, so that the OR element OR1 no longer produces any output to be applied to the AND elements **A1** and **A2.** This prevents the pulses from the generator PG and the pulses from the counter C4 from being applied to the counters **C1–C3.** This means that when the switch SB has been pressed, the indication of the fare then on the tubes LT1–LT4 remains unchanged, so that the passenger may pay the indicated amount of money.

When the push-button switch SB is pressed, a signal is also applied to the NOR element NR1. However, when the press on the switch SB is released, the switch is restored to its open position by itself, so that all the inputs to the NOR element NR1 disappear to produce an output to reset the counters C1–C3 and the flip-flop F3.

When the taxi stops and waits at the request of the passenger, a "waiting" fare must be added to the "distance" fare for every predetermined period of time the taxi waits. In this case, the switch WB is pressed. If the taxi is provided with this switch WB, the previously mentioned "time" fare addition system — that is, to add to the "distance" fare an additional fare for every predetermined period of time elapsed when the taxi has been slowed down or stopped due to heavy traffic or like circumstances — is not employed. To this end, a switch SVW is provided in ganged relation to the switch WB. The switch SVW is normally kept in touch with a contact V. When the switch WB is closed, however, the switch SVW is switched over to touch a contact W, so that the output of the NOT element N1 is now connected to one input of the AND element A2. When the switch WB is pressed, however, the switch KR or MR is restored to open position so that output from the OR element OR1 to the NOT element N1 becomes 0. This renders the output from the NOT element N1 1, so that the output of the AND element A2 becomes 1 every time a signal is applied to the element A2 through the line L4.

When the taxi has stopped at the request of the passenger, the generator PG necessarily stops production of output pulses, so that the output of the NOT element N2 is rendered 1 and remains to be 1. This continuous signal 1 is applied to the NOR element NR2, whereupon its output becomes 0 to remove the reset signal Re from the counter C4. Then every time the counter C4 has counted 16 pulses from the oscillator, it produces an ouput on the 15th output terminal, which is applied as one input to the AND element A2. Thus, every time the AND element A2 receives one pulse from the counter C4, it produces an output to be applied through the OR element OR2 to the counters C1–C3. The situation is quite the same as when the speed of the taxi has been lowered below the commercially payable level due to traffic congestion of the like circumstances, so that the fare is increased as the waiting time of the taxi passes by.

When the fare is to be revised, it is only required to change the connection between the output terminals S1–S12 of the counters C1–C3 and the terminals RS1–RS4, and the connection of the preset gate which presets the basic fare.

It is possible to record on a magnetic tape the total distance traveled by the taxi, the total paid distance, the number of trips and other information or data. In such a case, it is advisable to process the recorded data for each day by means of a suitable processor.

In the arrangement of FIG. 1, so long as the taxi travels at a commercially payable speed, with the pulse cycle of the generator PG being shorter than the count-up cycle of the counter C4, that is, the time required for the counter C4 to complete counting 16 pulses from the oscillator OSC, every time the generator PG applies one pulse to the NOT element N2 (with both flip-flops F1 and F2 being in reset condition), the output of the NOR element NR2 becomes 1 thereby to reset the counter C4, so that no output is applied by the counter C4 to the AND element A2. This means that there is no addition of fare due to lapse of time. However, when the vehicle speed has decreased to such a low level that the pulse cycle of the generator PG becomes longer than the count-up cycle of the counter C4, the counters C1–C3 count the output pulses from the AND elements A1 and A2. In this case, both the "distance" and "time" fares are charged. This is unreasonable.

FIG. 2 shows an arrangement directed toward solving this problem. The circuit shown in FIG. 2 corresponds to the left-hand portion of FIG. 1, with the remaining portion thereof not shown being substantially the same as in FIG. 1.

In FIG. 2, the pulses from the generator PG are applied to a differentiator D1, which produces a differentiated pulse corresponding to the leading edge of each pulse from the generator PG. The differentiated pulse is applied as one input to an AND element 11 on the one hand and as a set input to a flip-flop F11 on the other. The set output of the flip-flop F11 is applied as one input to an AND element A12, the output of which is applied as a set input to a flip-flop F12. The set output of the flip-flop F12 is applied as the other input back to the AND element A11.

The output pulses from the generator PG are also applied to a NOT element N11, the output of which is differentiated by a differentiator D2. The differentiated pulse corresponds to the trailing edge of the pulse from the generator PG and is applied as the other input to the AND element A12. The output produced by the counter C4 when it has counted up is differentiated by a differentiator D3, the output of which resets the flip-flop F11 and F12 and is also applied as one input to OR11, to which the output of the AND element A11 is applied as the other input. The output of the OR element OR11 is applied as one input to the AND element A1, the output of which is applied to the counters C1–C3 shown in FIG. 1.

So long as the cycle of the pulses from the generator PG is shorter than the count-up cycle of the counter C4, the pulses from the generator PG are differentiated by the differentiator D1, the output of which is applied as one input to the AND element A11. At this time, however, since the set output of the flip-flop F12 is 0 for the reasons to be given later, the AND element A11 produces no output. The differentiated pulse from the differentiator D1 sets the flip-flop F11, so that its set output is applied as one input to the AND element A12. However, since the other input to the AND element A12 is 0 at this time, the element A12 produces no output. After the differentiated pulse from the differentiator D1 disappeared, the differentiator D2 produces an output pulse to be applied to the AND element A12, so that this element A12 produces an output to set the flip-flop F12. The set output of this flip-flop is applied as one input to the AND element A11. At this time, however, the other input (that is the differentiated pulse from the differentiator D1) to the AND element A11 has already disappeared, so that no output is produced by the AND element A11. However, when the next pulse is produced by the pulse generator PG, the differentiated output from the differentiator D1 caused thereby is applied as one input to the AND element A11, and with the set output of the flip-flop F12 at this time applied to the other input of the AND element A11, the element A11 produces an output to be applied through the OR element OR11 and the AND element A1 to the counters C1–C3. Thus, immediately after the taxi has started or the counter C4 has counted up as will be discribed later, the first pulse from the generator PG is not counted by the counters C1–C3. However, unless the counter C4 has counted up before the next pulse is produced by the generator PG, the flip-flop F11 and F12 are not reset, so that the pulse is counted by the counters C1–C3.

When the velocity of the taxi has decreased below the predetermined level so that the pulse cycle of the generator PG becomes longer than the count-up cycle of the counter C4, the system will operate as follows. Suppose that by that time the flip-flops F11 and F12 have already been set. For simplicity of explanation, it is assumed that a pulse has been produced by the generator PG in coincidence with a pulse produced by the counter C4 when it has counted up. Between this time and the time the next pulse is produced by the generator PG, the counter C4 counts up to produce an output. This count-up output is applied to the differentiator D3 and the differentiated output therefrom resets both the flip-flops F11 and F12, so that despite the next pulse from the generator PG applied to the AND element A11, it produces no output pulse to be counted by the counters C1–C3.

On the other hand, the previously mentioned differentiated pulse from the differentiator D3 is applied to the OR element OR11, the output of which is applied as one input to the AND element A1. Then the AND element produces an output to be counted by counters C1–C3.

FIG. 3 shows a further improvement in the arrangement of FIG. 2. The first pulse from the pulse generator PG is differentiated by the differentiator D1. The differentiated pulse corresponding to the leading edge of the pulse from the generator PG is applied as one input to the AND element A11. If at this time the flip-flop F12 is not in set condition, the AND element A11 produces no output. The above-mentioned first pulse from the generator PG is also applied through the NOT element N11 to the differentiator D2, the differentiated output of which corresponding to the trailing edge of the first pulse from the generator sets the flip-flop F12. The set output of the flip-flop F12 is applied to the AND element 11, but since there is no output from the differentiator D1 at this time, the AND element A11 produces no output. However, every time the generator PG produces a pulse once the flip-flop F12 has been set, the AND element A11 produces an output to be applied through the OR element OR11 to the counters C1–C3. However, when the pulse cycle of the generator PG becomes longer than the count-up cycle of the counter C4, the pulses from the generator PG are not counted by the counters C1–C3. That is, when the output of the NOR element NR2 resets the counter C4 through an OR element OR21, the same output actuates a timer T, the delay time of which is preset equal to the count-up cycle of the counter C4. Therefore, when the same period of time as the count-up cycle of the counter C4 has elapsed after the counter C4 was reset, the timer T produces an output to reset the flip-flop F12 before the second pulse from the generator PG causes the differentiator D2 to produce a differentiated pulse. At the same time, the output produced by the counter C4 as it has counted up is applied through the OR element OR11 to the counters C1–C3. The output of the counter C4 and the output of the AND element A11 are applied to an OR element OR22, the output of which is applied to the OR element OR21, so that every time the counter C4 counts up and the AND element A11 produces an output, the counter C4 is reset.

What we claim is:

1. A taximeter, comprising

a taxi fare counter capable of being incremented for indicating a taxi fare;

first pulse generating means for generating a distance related pulse for each predetermined distance travelled by a taxi;

second pulse generating means for generating clock pulses at a predetermined rate;

first counter means having a fixed counting cycle for counting said clock pulses, wherein said first counter means produces a first counter output signal at the conclusion of each fixed counting cycle, said fixed counting cycle and said predetermined rate of clock pulses being related to a predetermined taxi speed such that said first counter means will count through at least one fixed counting cycle between successive distance related pulses generated by said first pulse generating means when taxi speed falls below the predetermined taxi speed;

second counter means for counting said distance related pulses and said first counter output signals, said second counter means producing a second counter output signal whenever a predetermined count is achieved;

first means for applying said first counter output signals to said second counter means;

second means for applying said distance related pulses to said second counter means;

means operable to reset said first counter means upon application of a distance related pulse to said second counter means at least during an interval initiated at an incrementation of the taxi fare counter and terminated at the next successive second counter output signal; and,

means responsive to said second counter output signals for incrementing the taxi fare counter.

2. An apparatus of claim 1, including a first switch means for setting the taxi fare to an initial value.

3. An apparatus of claim 1, including means for varying said initial value, and means for varying said predetermined count of said second counting means.

4. An apparatus of claim 1, including means for preventing the application of said distance related pulses to said second counter means when the taxi speed has fallen below the predetermined speed.

5. An apparatus of claim 4, wherein said preventing means includes an AND gate and a first bistable element, said first bistable element having first and second outputs, and including means to condition said first bistable element such that a signal appears at a selected one of said first and second outputs, the presence of a signal at said first output indicating that no intervening first counter output signal has occurred since the last successive distance related pulse.

6. An apparatus of claim 5, wherein said conditioning means includes means responsive to a first distance related pulse to set said first bistable element such that a first bistable element signal is produced at said first output, said first bistable element signal energizing said AND gate to pass successive distance related pulses to said second applying means, and means responsive to said first counter output signals for resetting said first bistable element such that a second bistable element signal is produced at said second output, thereby blocking further application of distance related pulses to said second counter means until a next distance-related pulse again sets said first bistable element.

7. A taximeter comprising:

first pulse generating means for producing a predetermined number of distance pulses for every predetermined unit distance travelled by a taxi;

a first bistable element, capable of being set and reset;

means for applying said distance pulses to said first bistable element to set said bistable element;

a first gate for passing said distance pulses whenever said first bistable element has been set;

second pulse generating means having a fixed cycle for producing clock pulses;

first counter means for counting said clock pulses in the absence of said distance pulses;

hired-hour signal producing means generating hired-hour pulses for resetting said first bistable element whenever said first counter means has reached a predetermined count, thereby closing said first gate;

first setting means for establishing a basic fare, wherein said first setting means is set when a passenger enters the taxi;

second counter means for indicating a basic taxi fare when said first fare setting means has been set;

third counter means having a series of outputs for counting the distance signals passed by said first gate and for counting the hired-hour pulses whenever said first fare setting means is set;

second setting means for establishing a set number of distance pulses passed by first gate corresponding to a basic distance to which the passenger is entitled for said basic fare;

means for detecting the presence of a count in said third counter means corresponding to said set number of distance pulses;

a second bistable element, said second bistable element being capable of being set and reset;

means for setting said second bistable element when said count in said third counter means corresponding to said set number of distance pulses is detected by said detecting means; and,

a second gate responsive to a predetermined count of said third counting means following the setting of said second bistable element to increment said second counter means by an amount corresponding to an additional fare.

8. The taxi meter of claim **7,** wherein said second setting means is responsive to selected outputs of said third counting means.

9. The taxi meter of claim **7,** wherein said first setting means includes at least first and second switches, said first and second switches being set when the taxi starts with a passenger therein to establish the basic fare and an increased basic fare, respectively.

10. The taxi meter of claim **9,** wherein said first setting means further includes means for presetting in said second setting means a signal corresponding to the basic fare when said first switch has been set and a signal corresponding to the increased basic fare when said second switch has been set.

11. The taxi meter of claim **7,** wherein said third counting means counts said distance pulses passed by said first gate and said hired-hour pulses as the taxi travels an additional distance after travelling the basic distance, and including a third setting means, wherein said third setting means establishes a total count of distance pulses passed by said first gate and hired-hour pulses corresponding to the additional distance.

12. The taxi meter of claim **11,** including means for providing an additional fare signal to said second counting means whenever the third counting means accumulates a count established by said third setting means.

13. The taxi meter of claim **7,** wherein said third counting means counts the distance pulses passed by said first gate and the hired-hour pulses as the taxi travels an increased basic distance at the increased basic fare, and including a fourth setting means for establishing a total count of distance pulses passed by said first gate and hired-hour pulses corresponding to the increased basic distance.

14. The taxi meter of claim **7,** wherein said third counting means counts said distance pulses passed by said first gate and said hired-hour pulses as the taxi travels an additional distance at the additional fare, after it has travelled the increased basic distance at the increased basic fare and including a fifth setting means, wherein the fifth setting means establishes a total count of said distance pulses passed by said first gate and said hired-hour pulses corresponding to the additional distance travelled by the taxi at the additional fare rate.

15. The taxi meter of claim **14,** including means for providing an additional fare signal to said second counting means whenever the third counting means accumulates a count established by said fourth setting means.

16. The taxi meter of claim **7,** wherein said detecting means comprises a first detector for detecting when the count accumulated by said third counting means reaches a count set by said second setting means, and a second detector for detecting when the count accumulated by said third counting means reaches a count set by said third setting means.

17. The taxi meter of claim **16,** including memory means for activating said second detector and simultaneously disabling said first detector when said first detector has produced an output signal.

18. The taxi meter of claim **7,** further including a third switch, and wherein said third switch is closed when the taxi stops at the request of a passenger therein, and means operable upon closure of said third switch to enable said third counting means to continue counting said hired-hour pulses, but not said distance pulses passed by said first gate.

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