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"Speed Alarm Device for Automobiles"

THIS INVENTION relates to a speed alarm device for automobiles, and more particularly, to a speed alarm device for automobiles in which an alarm indication is obtained when the speed exceeds a set speed and an indication
5 different from the alarm indication is obtained when the automobile stops by detecting such a stop.

A device is generally known for generating an alarm when the automobile speed exceeds a preset speed. Such devices include those which flash an indicating lamp, which
10 generate intermittent sounds by operating a buzzer, and so on.

However, with such conventional devices, analog changes of the speedometer pointer are detected for obtaining an alarm by detecting the angle of deflection of the pointer of
15 the speedometer, and an alarm is obtained when this angle of deflection exceeds the set value. Thus, the proper set value is difficult to obtain. Further, the response is inferior for abrupt changes.

It is, therefore, the primary object of this invention
20 to provide a speed alarm device for automobiles in which an alarm may be obtained without error when the speed exceeds the set value, and the set value for obtaining the alarm may be easily changed so that an indication responsive to every

need of the automobile may be obtained.

Accordingly the invention provides a speed alarm device for automobiles characterized by comprising a sensor for generating a pulse signal of a frequency corresponding to the travelling speed of an automobile; a first oscillation circuit which oscillates at a preset period; a first control circuit for controlling said first oscillation circuit according to whether a pulse signal of a frequency below a predetermined value, a pulse signal of a frequency above said predetermined value, or no pulse is obtained from said sensor; a second control circuit for operating indicating means when no pulse signal is obtained from said sensor; a third control circuit for interrupting the operation of said indicating means when the frequency of said pulse signal is below said predetermined value; and an oscillation circuit which oscillates when the frequency of said pulse signal is above said predetermined value, whereby said indicating means is flashed by the operation of said oscillation circuit.

In order that the invention may be readily understood, an embodiment thereof will now be described, by way of example, with reference to the accompanying drawings in which :

FIGURE 1 is a circuit diagram of a speed alarm device for automobiles of this invention;

FIGURE 2 shows the output voltage characteristics of the first oscillation circuit and related parts when the automobiles stops;

FIGURE 3 shows the first oscillation circuit and related parts when the automobile is travelling at a normal speed; and

FIGURE 4 shows the output voltage characteristics of the first oscillation circuit and related parts when the speed of the automobile exceeds the set speed.

Referring to the drawings, SN denotes a sensor which is on or off when the automobile is stopped and which generates a pulse signal proportional to the speed by

turning on or off according to the travelling speed.

This sensor SN is alternately turned on and off by a magnet Mg which is coupled to the speedometer cable of the automobile and which rotates according to the rotation of the cable.

Numeral 1 denotes a differentiation circuit; 2, a first control circuit; 3, a first oscillation circuit; 4, a second control circuit; 5, a third control circuit; 6, a second

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oscillation circuit; 7, a fourth control circuit; 8, a third oscillation circuit; and 9, a power source. The differentiation circuit 1 includes input terminals t1 and t2 between both ends of a capacitor C1. When an input pulse signal of a frequency corresponding to the turning on or off speed of the sensor SN is applied to these terminals t1 and t2, a differentiation pulse is obtained by a capacitor C2 and resistors R2 and R3. At the rising edge of the differentiation pulse, a transistor Q1 of the first control circuit 2 is turned on, and the charge stored on a capacitor C3 of the first oscillation circuit 3 is discharged through a diode D1 and the transistor Q1.

When the input pulse is not supplied, the first oscillation circuit 3 oscillates at a time constant determined by the capacitor C3 and resistors R5 and R6. That is, the on and off operation of a programmable UJT Q2 are repeated so that the oscillation output is reduced when the transistor Q1 is turned on. This oscillation period is synchronized with the 30 Hz frequency of the input pulse for obtaining an alarm at a travelling speed of 100 km/h, for example, with the reference period (T in Fig. 2) set by varying the resistor R6. The second oscillation circuit 6 has the same frequency as a flashing frequency (about 1 Hz) of indicating lamps such as a light emitting diode D4 and a dome light DL mounted on the roof of the automobile or the like, and the third oscillation circuit 8 has the same frequency as an oscillation frequency (about 500 Hz) of a

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speaker SP. These oscillation circuits 6 and 8 are of the known circuit construction consisting of resistors and capacitors.

5 The second control circuit 4 functions to turn off the dome light DL by holding transistors Q6 and Q7 of the fourth control circuit 7 while the first control circuit 2 is in operation. . The charge stored on a capacitor C4 through a resistor R11 is discharged through a diode D3 when the transistor Q1 of the first control circuit 2 is turned on,
10 so that the voltage across the terminals of the capacitor C4 is not raised, and the transistors Q6 and Q7 of the fourth control circuit 7 are kept off.

The operation of the respective parts will now be described with reference to the cases wherein the automobile
15 is stopped, the automobile is travelling at a normal speed, and the automobile is travelling at a speed exceeding a set speed.

(1) When a normal voltage is applied to the power source 9 and the automobile is stopped:

20 Since the sensor SN remains on or off, the voltage at the point A of the differentiation circuit 1 is the power source voltage (sensor SN: on) or zero voltage (sensor SN: off). Since no input is obtained through the capacitor C2 and the resistor R2, the transistor Q1 of the first control
25 circuit 2 is off.

Since there is no discharge through the diode D3, the second control circuit 4 acts on the fourth control



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circuit 7 to turn on the transistors Q6 and Q7 through a diode D5 and to turn on a transistor Q5. Consequently, the dome light DL and the light emitting diode D4 are lit. The light emitting diode D4 is one kind of indicating means mounted on the dashboard or the like for providing an indication for the operator, and the dome light DL indicates to the outside that the automobile is stopped.

In the first oscillation circuit 3, the capacitor C3 is charged through the resistors R6 and R5. When the charged voltage reaches a voltage at which an anode A and a cathode K of the programmable UJT Q2 are conductive, the charge is discharged through the UJT Q2. Fig. 2 shows the voltage obtained at the point E with a reference period T when the first oscillation circuit 3 is oscillating under the preset condition and the voltages at other parts. The output voltage at the point E turns on a transistor Q3 of the third control circuit 5 through a resistor R12 at every period T, so that the charge stored on a capacitor C6 of the second oscillation circuit 6 is constantly limited to a small amount by being discharged while the transistor Q3 is on. Thus, the second oscillation circuit 6 does not oscillate. A transistor Q4 of the fourth control circuit 7 is off since the second oscillation circuit 6 is not in operation. Thus, the third oscillation circuit 8 does not operate and the speaker SP does not operate.

(2) When the automobile is travelling at a normal speed:

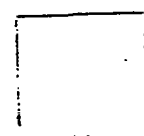


Fig. 3 shows the output voltage of the first oscillation circuit 3 and related parts when the automobile is travelling at a normal speed. Since the sensor SN is turned on and off at a period proportional to the travelling speed of the automobile, an output of a period T_S corresponding to the travelling speed at this time is obtained at the point X. The output is then differentiated by the capacitor C2 and the resistors R2 and R3 so that a voltage as shown in Fig. 3 is obtained at the point Y. The transistor Q1 is turned on by the positive side output of the voltage at the point Y and charges the capacitor C3. Although the capacitor C3 is discharged again through the resistors R6 and R5, the period of the voltage at the point E changes from T to T_1 since the discharge operation of the voltage at the point Y is repeated at a period T_S .

However, since the transistor Q3 of the third control circuit 5 is turned on by the output of the period T_1 , the capacitor C6 of the second oscillation circuit 6 is discharged and its terminal voltage is reduced, so that the second oscillation circuit 6 remains inoperative.

Since the capacitor C4 of the second control circuit 4 is discharged when the transistor Q1 of the first control circuit 2 is on, its terminal voltage is reduced. Therefore, the transistor Q6 of the fourth control circuit 7 is off. The transistors Q7 and Q5 are off so that the light emitting diode D4 and the dome light DL are off. Since the third oscillation circuit 8 remains inoperative, the

speaker SP does not operate.

According to the device of this invention, the diode D4 and the dome light DL are off and the speaker SP is inoperative under normal travelling conditions.

- 5 (3) When the automobile is travelling at a speed exceeding the set speed:

Fig. 4 shows the output voltage of the first oscillation circuit 3 and related parts when the automobile is travelling at a speed exceeding the set speed. Since the turning on and off speed of the sensor SN is increased, the transistor Q1 is turned on at every period T_{S1} of the voltage at the point X. Then, the discharged capacitor C3 starts charging again. However, the transistor Q1 is rendered conductive before the capacitor C3 reaches the A-K conductive voltage of the programmable UJT Q2. Thus, the oscillation operation of the first oscillation circuit 3 is interrupted so that the voltage at the point E becomes zero.

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As a result, the terminal voltage of the capacitor C6 of the second oscillation circuit 6 is raised and oscillation is initiated. The transistor Q4 of the fourth control circuit 7 repeats the on and off operations to flash the dome light DL. Since the transistor Q5 also repeats the same operation, the light emitting diode D4 also flashes.

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The third oscillation circuit 8 also starts oscillating by the operation of the transistor Q4, so that the speaker SP generates intermittent sounds in synchronism with the oscillating period.

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In this manner, when the automobile is travelling at a speed exceeding the set speed, the dome light DL and the light emitting diode D4 flash and the speaker SP generates intermittent sounds.

5 SW1 is a checking switch for checking if the light emitting diode D4, the dome light DL and the speaker SP are functioning normally.

In summary, according to the device of this invention, the indicating lamps and the speaker operate differently
10 according to whether the automobile is travelling at a normal speed or at a speed exceeding the set speed, so that the operator of the automobile as well as pedestrians and the operators of other automobiles can easily confirm the travelling speed level of this automobile. The set speed
15 may be easily set by changing the oscillating period of the first oscillation circuit as the reference oscillation period, so that it may be easily adjusted to the different standards of each country.

The control operation is performed entirely by
20 electrical signals so that the operation may be correct and precise. Few mechanical contacts are involved, so the device becomes durable.



CLAIMS

1. A speed alarm device for automobiles characterized by comprising a sensor for generating a pulse signal of a frequency corresponding to the travelling speed of an automobile; a first oscillation circuit which oscillates at a preset period; a first control circuit for controlling said first oscillation circuit according to whether a pulse signal of a frequency below a predetermined value, a pulse signal of a frequency above said predetermined value, or no pulse is obtained from said sensor; a second control circuit for operating indicating means when no pulse signal is obtained from said sensor; a third control circuit for interrupting the operation of said indicating means when the frequency of said pulse signal is below said predetermined value; and an oscillation circuit which oscillates when the frequency of said pulse signal is above said predetermined value, whereby said indicating means is flashed by the operation of said oscillation circuit.

2. A speed alarm device as claimed in claim 1, wherein said indicating means comprises an indicating lamp and a dome light.

3. A speed alarm device substantially as hereinbefore described with reference to the accompanying drawings.

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