



- (51) International Patent Classification:  
*B60Q 5/00* (2006.01)     *H04R 3/00* (2006.01)
- (21) International Application Number:  
PCT/IB2016/054367
- (22) International Filing Date:  
22 July 2016 (22.07.2016)
- (25) Filing Language: English
- (26) Publication Language: English
- (72) Inventor; and
- (71) Applicant : TACHOTH, Vasudevan [IN/IN]; V-95, Sree Vatsa Hill View, Kovaipudur, Coimbatore 641042, Tamil Nadu (IN).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,

SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

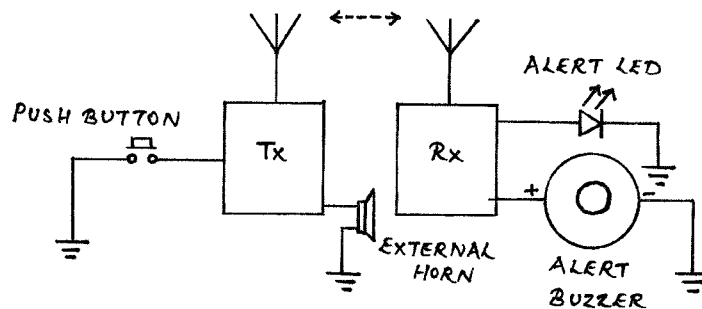
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

**Published:**

- with international search report (Art. 21(3))
- with amended claims (Art. 19(1))
- upon request of the applicant, before the expiration of the time limit referred to in Article 21(2)(a)

(54) Title: A NOISE FREE VEHICULAR HORN (V-HORN) DESIGNED FOR THE REDUCTION OF NOISE POLLUTION

Figure 1 : Functioning of Noise Free Vehicular Horn



Tx → TRANSMITTER  
Rx → RECEIVER

(57) Abstract: A noise free vehicular horn (v-horn) designed for the reduction of noise pollution is a novel idea about fabricating a horn which never disturbs the balance of ecosystem. Horn, meant for alerting, is always manufactured in a way that it produces loud sound. A vehicular horn is considered as good when sound is intense. Commonly used horns emit sound beyond the permissible limits and causes health problems ranging from headache to cardiovascular disorders. This is an invention capable of changing current situation. Transmitter-receiver kit and low decibel convention horn are the two major parts. When the horn button in the vehicle behind is pressed, sound signal which is transmitted in the modulated form gets demodulated by the receiver in the vehicle ahead and produces a beep sound. Thus the pedestrian or driver can be warned without irritating others. Circuit diagrams of transmitter and receiver are shown in the specification.

WO 2017/144960 A1

## **A NOISE FREE VEHICULAR HORN (V-HORN) DESIGNED FOR THE REDUCTION OF NOISE POLLUTION**

### **Field of invention and use of invention**

This invention relates to communication discipline and it is applicable in the field of automobiles. The novel device is a vehicular horn which does not irritate the pedestrians or passengers by producing deafening sound. The system works on the principle of wireless transmission of modulated signal. Compared to currently used horn types, noise free vehicular horn is capable of alerting the driver or pedestrian without making loud sound. Noise pollution can be controlled to a minimum level by the implementation of this system to all vehicles. Thereby many health problems due to noise can be prevented. The three operating modes of v-horn make it suitable to be used in silence zones also.

### **Prior art and problem to be solved**

Noise Pollution is one of the alarming environmental threats, which makes many negative consequences in the ecosystem. The problem should be considered as important as air and water pollution. But unawareness about the troubles caused by ear-splitting sounds is the main reason behind the low grade given to noise pollution. Keen observations show that vehicular horns are one of the major contributors to noise pollution. It is a common scene in roads where drivers are simply blowing horn of no use thereby disturbing the pedestrians, passengers of other vehicles, other living beings etc.

A decibel is the standard for the measurement of noise. The response of the human ear to sound depends both on the sound frequency (measure in Hertz, Hz) and the sound pressure (measured in decibels, dB). Human beings can detect sounds in the frequency range, 20Hz-20,000Hz. On a decibel scale the lowest threshold of hearing is 0dB, whispering sound is 20dB, noise in a quiet office is 40dB, a normal conversation holds 60dB, noise from industries, vehicles, crackers etc starts around 80dB and the highest threshold of hearing is 180dB

causing the ear drum to damage. Sound intensity from 0dB to 80dB can be taken as healthy range for human beings. But it has been proven that continuous exposure to sound above 80dB intensity could induce heart attacks and increase stress levels.

Commonly used horns produce sound in the range of 75dB to 120dB. Even though the sound emitted by single horn is below 80dB, the threshold level will be crossed since pedestrians and passengers are exposed to many such horns on a highway. Numerical difference between 80dB and 90dB is just 10dB while 10dB increase in sound intensity doubles the loudness. According to the motor vehicle rules, two-wheelers should not use horns emitting more than 80dB sound. Similarly, for cars and petrol auto rickshaws the permissible limit is 82dB, for light heavy vehicles and diesel auto rickshaws limit is 85dB and horns of lorry, bus etc should not exceed 91dB. However some noise survey articles show that noise level in most of the areas is in the range of 80dB-120dB which is much higher than the acceptable limits.

Currently used horn types are:

1. **Air Horn:** It is an apparatus that makes a loud noise from pressurized air tank and air compressor. Air horns are used in buses and heavy vehicles like trucks.
2. **Electric Horn:** As the name indicates it is powered by electricity. The horn produces either a low- or high-pitched sound.
3. **Musical Horn:** Musical car horns produce sample of music instead of common horn sound.
4. **Disc Horn:** Flat shaped small horns with good sound quality.
5. **Snail Horn:** Snail shaped horn having long life and beautiful sound quality.
6. **Siren Horn:** Trumpet shaped horn producing variety of sounds. It is usually used in vehicles of police department, fire trucks, ambulance etc.

All these types have been designed for producing high decibel sound and there is no notable difference except in the case of musical horn. But even if the horn is musical type, its loudness may annoy the pedestrians and passengers. Thus a change is necessary in the design of vehicular horns.

### **Objects of the invention**

The scientific studies confirm that noise pollution is a severe problem causing adverse effects on human health, such as hearing impairment, high blood pressure, cardiovascular ailments, headache, psychological disorders, interrupted sleep, memory loss, distraction etc and intense noise particularly affect the problem solving ability and memory of children. Exposure to sudden loud sound will have an effect on the ear drums, if the person is standing close to the sound source. I observed some birds sheltered on trees nearby roads, animals like squirrels, dogs etc and found that those creatures are extremely getting annoyed due to the piercing sound from horns. These problems are also discussed in some articles.

The principal object of this invention is to reduce the noise from vehicular horns. Another purpose of this invention is to prevent the noise pollution related health troubles. I have a goal of diminishing the noise pollution caused by vehicles and thereby comforting all the living beings to lead a quality life. This invention also aims at creating a peaceful atmosphere in the highways to attract more birds and tiny animals in order to keep the balance of ecosystem.

### **Summary**

Nearly three decades back, when I was a higher secondary student, I designed this noise free vehicular horn. The thought for such a gadget came from the usual disturbance caused by horns. At that time it was my dream to design a vehicular horn which never irritates the pedestrians. From my grandmother I heard about the bells used in the bullock carts for alerting. Then different types of

horns were invented. But all those devices emitted loud sounds which have negative influence on human beings and other living things. Loudness increased from horn to horn. Search for an alternative way led me to an innovative idea. With my inadequate technical knowledge I designed a wireless horn and named the system as V-Horn but practically I couldn't execute the same those days. Now I redesigned that device with more features and successfully completed the demonstration.

Noise free vehicular horn is a system which works on the principle of wireless transmission of modulated signal. Usually the sound produced by horns travel through the air and our ear receives the high decibel sound as it is. Here the sound signal is superimposed into a radio carrier wave and it travels between the transmitter antenna and receiver antenna in the modulated form. Thus only a beep sound is produced from the receiver fixed near the steering. So it does not irritate anyone. For urgent uses, an external horn that emits sound around 63dB is also available. When a pedestrian is crossing carelessly, this horn can be applied. The detailed functioning of v-horn is given in the next section.

### **Detailed description**

As mentioned before wireless transmission of the modulated signal is the principle behind noise free vehicular horn. Before entering to the working section we must be clear about modulation. The most common wireless technologies use radio frequency signals. Using radio waves, communication can be carried out for both short and long distances. Every wireless communication based system is made up of dual combination of transmitter and receiver.

Primary method for transmitting audio, visual, and other types of information using radio waves is to superimpose the particular signal onto a radio carrier wave. This process can be executed in two ways namely amplitude modulation (AM) and frequency modulation (FM). In amplitude modulation, amplitude of the carrier wave is varied in accordance with that of the input signal.

For example, consider that the signal to be carried is a sound wave. So its value at each point is reflected in the amplitude of the radio frequency carrier wave. Thus the amplitude of the carrier wave is changed in accordance with the input signal while its frequency remains unchanged. In frequency modulation, frequency of the carrier wave is varied in accordance with the input signal and its amplitude remains the same.

The signal to be transmitted is superimposed to carrier wave. On reception of the signal, the receiver, which is tuned to the frequency of the carrier wave, decodes and demodulates the signal to its original form. This is how wireless transmission works. Let us now see how this principle of radio communication is implemented in noise free vehicular horn (v-horn).

Noise free vehicular horn consists of a transmitter-receiver kit and low decibel convention horn. This low decibel convention horn is the vehicle's external horn which produces a sound of around 63dB and can be named as external horn. The whole system is powered by the vehicle battery. Figure 1 and figure 2 of the drawings show the transmitter and the receiver circuits respectively.

When the push button on the transmitter part is pressed the sound signal is produced and it is modulated with a radio carrier wave which may have frequency within the range of 300-600MHz. this modulated sound signal is then transmitted from the antenna. Transmitter and receiver communicate through channel '0' and reject all the information from other channels, making it easier for identification of signal from the transmitter. The transformed signal is accepted by the receiver antenna and it is send to the decoder part for the separation of sound signal from radio carrier wave. When the signal source is identified by the receiver, a beep sound can be heard from the buzzer together with Light Emitting Diode (LED) glow alerting the driver about vehicles running behind his/her vehicle. The kit is placed near the steering so that the driver in the

vehicle behind can simply apply the horn and driver in the vehicle ahead get warned through low decibel beep sound and LED light.

The system operates in 3 modes named as dual mode, wireless mode and auto mode. When the device is in dual mode two uses are there. The received signal simulates the (a) buzzer-LED combination, which inform the driver only, and (b) also the external horn in order to alert the pedestrians. If the equipment is set in wireless mode, it works like first option of dual mode thereby breaking the connection to external horn. The third and last, auto mode operation depends on the status of Light Dependent Resistor (LDR). At night LDR does not work because of the absence of sunlight. Thus a switch fixed near LDR automatically gets off during night and external horn will be disconnected. Therefore the rule is obeyed even if the citizen is not willing to.

V-Horn Vs Normal Horns:

During a trial run performed on national highway from 5:30pm to 7:30pm at Coimbatore, external horn got automatically off around 6:30pm. Light dependent resistor used in the receiver part helped in disconnecting the external horn at that time. This tryout confirmed that the auto-mode is correctly running from a specific time. At the same time vehicles with normal horns were running through the highway by applying high decibel horns. Then the device was put in wireless mode for travelling through horn-prohibited areas like hospitals and schools. Thus our vehicles applied horn and passed these zones without breaking the rules. As mentioned before, some vehicles installed with regular horns, produced loud noise within these silence zones. Another advantage of my equipment is exhibited in the hairpin bends where the drivers cannot see the vehicle coming opposite because of the curve. Since the receiver part accepts the signal in the range of 200m driver can be alerted easily. These types of roads are mostly in forest areas where the wild life may get disturbed due to ordinary horns. So usage of our system resolves problems like annoyance to nature. Noise survey using Sound level meter proved that the sound produced from vehicles, in

which new horn is installed, was below the legalized threshold value. But in the case of vehicles with general types of horns, it is never possible to lead a journey without disturbing the peaceful atmosphere of forest areas.

Besides these features one more attribute can be added if this type of horn is accepted by the government and it is made mandatory in all vehicles. Now the system has wireless mode. Hence in horn-prohibited areas it can be put in wireless mode. If the above said new feature is added, it wouldn't be necessary to put on the wireless mode. Although the system is in dual mode the external horn does not work because of the signal blocking device fixed in those areas. Thus noise free vehicular horn is a novel device bearing many advantages over the current systems and it can be made industrially if the government make this compulsory in all vehicles. Also noise pollution and health effects could be controlled to a minimum by the use of v-horn.

### STATEMENT OF CLAIMS

1. I claim that I have developed a noise free vehicular horn which alerts, but never irritates the pedestrians or passengers and thereby makes a comfortable atmosphere to other living beings also.
2. I claim that my invention is based on the principle of wireless transmission of modulated signal.
3. I claim that this system works by transmitting sound signal superimposed to radio carrier wave in the range of 300-600MHz.
4. I claim that the driver, pedestrians, or passengers are warned when the signal mentioned in Claim 4 is received and demodulated by the receiver part and accordingly beep sound is produced with LED glow.
5. I claim that this device works in three modes namely dual mode, wireless mode and auto mode.
6. I claim that a low decibel convention horn (external horn), which produces sound in the healthy range, is joined to the transmitter to be used in urgent situations.
7. I claim that my invention includes a light dependent resistor (LDR) which enables auto mode for the automatic disconnection of external horn at nighttimes.
8. I claim that the wireless mode of the invented horn is suitable to be used in horn-prohibited areas too.
9. I claim that an extra feature of signal blocking devices like jammer can be added to the device for the automatic disconnection of external horn in silence zones.
10. I claim that noise free vehicular horn (v-horn) is a novel device developed by myself and the idea has never been used anywhere to the best of my knowledge.

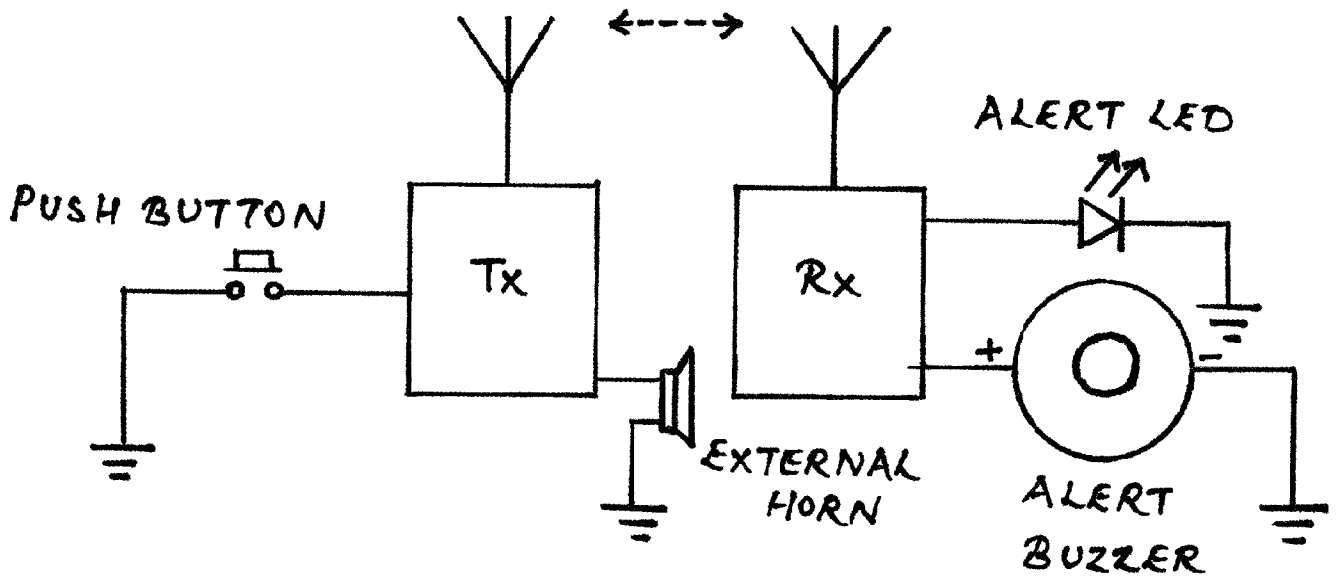
## AMENDED CLAIMS

received by the International Bureau on 22 December 2016 (22.12.2016)

1. I claim that I have developed a noise free vehicular horn which alerts, but never irritates the pedestrians or passengers and thereby makes a comfortable atmosphere to other living beings also.
2. I claim that wireless transmission of the modulated signal is the principle behind noise free vehicular horn.
3. I claim that wireless technologies used is the radio frequency signals which can be carried out for both short and long distances.
4. I claim that noise free vehicular horn consists of a transmitter-receiver kit and low decibel convention horn.
5. I claim that the low decibel convention horn is the vehicle's external horn which produces a sound of around 80dB.
6. I claim that the whole system is powered by the vehicle battery.
7. I claim that when the push button on the transmitter part is pressed the sound signal is produced and it is modulated with a radio carrier wave which may have frequency within the range of 300-600MHz.
8. I claim that transmitter and receiver communicate through channel '0' and reject all the information from other channels, making it easier for identification of signal from the transmitter.
9. I claim that the transformed signal is accepted by the receiver antenna and it is send to the decoder part for the separation of sound signal from radio carrier wave and accordingly a beep sound can be heard from the buzzer together with Light Emitting Diode (LED) glow.
10. I claim that the kit is placed near the steering so that the driver in the vehicle ahead get warned through low decibel beep sound and LED light.
11. I claim that the system operates in 3 modes named as dual mode, wireless mode and auto mode.
12. I claim that when the device is in dual mode, the received signal simulates the buzzer-LED combination, which inform the driver only, and also the external horn in order to alert the pedestrians.
13. I claim that in the wireless mode, it works like first option of dual mode thereby breaking the connection to external horn.

14. I claim that the auto mode operation depends on the status of Light Dependent Resistor (LDR). The switch fixed near LDR automatically gets off during night and external horn will be disconnected.
15. I claim that the wireless mode of the invented horn is suitable to be used in horn-prohibited areas too.
16. I claim that an extra feature of signal blocking devices like jammer can be added to the device for the automatic disconnection of external horn in silence zones.
17. I claim that noise free vehicular horn (v-horn) is a novel device developed by myself and the idea has never been used anywhere to the best of my knowledge.

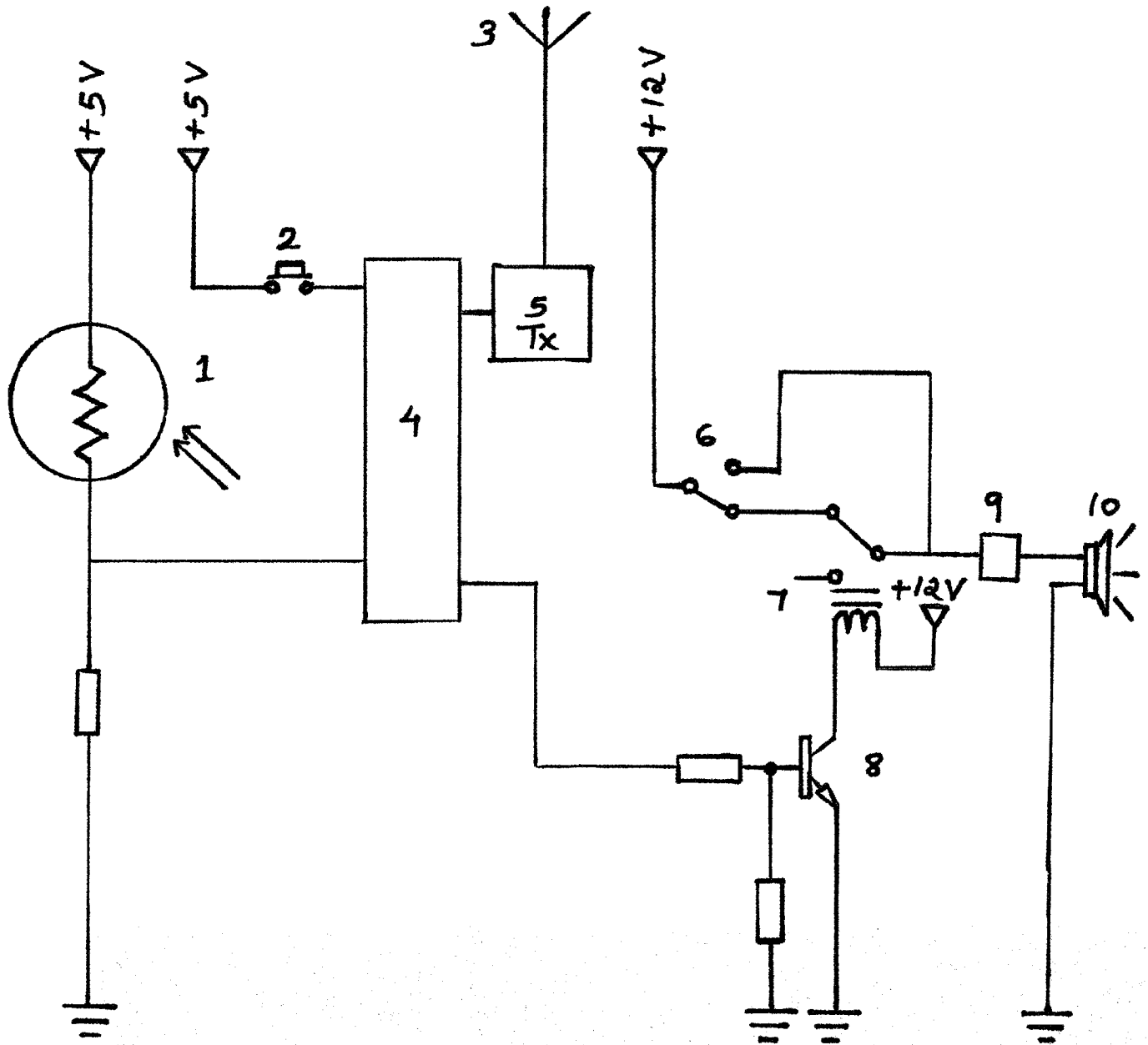
Figure 1 : Functioning of Noise Free Vehicular Horn



Tx → TRANSMITTER

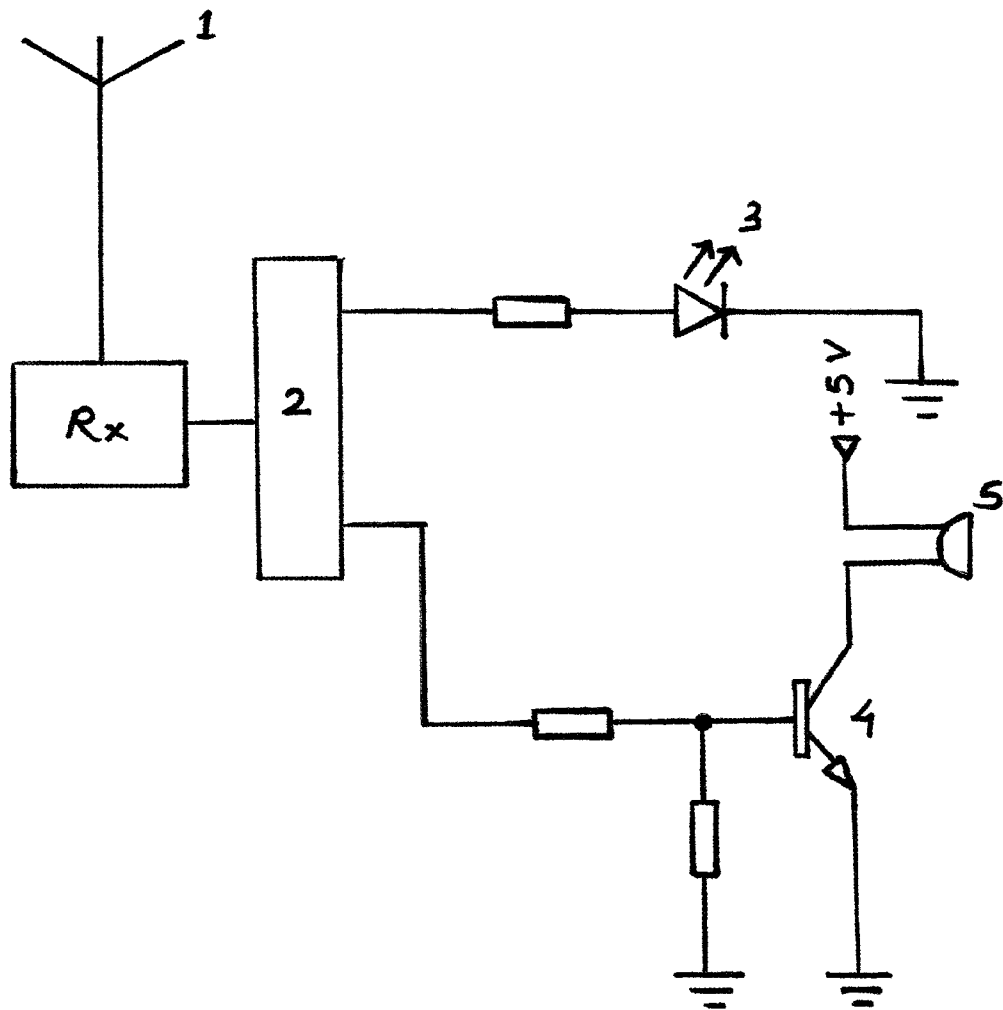
Rx → RECEIVER

Figure 2: Circuit diagram of transmitter



- 1. LIGHT DEPENDENT RESISTOR (LDR)
- 2. PUSH BUTTON
- 3. ARIAL
- 4. MICROCONTROLLER
- 5. ENCODER
- 6. AUTOMATIC/MANUAL SWITCH
- 7. RELAY
- 8. TRANSISTOR
- 9. STEERING HORN SWITCH
- 10. EXTERNAL HORN

Figure 3: Circuit diagram of receiver



1. ARIAL
2. DECODER
3. ALERT LED
4. TRANSISTOR
5. ALERT BUZZER

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2016/054367

A. CLASSIFICATION OF SUBJECT MATTER  
B60Q5/00, H04R3/00 Version=2016.01

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60Q, H04R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Databases: PatSeer, IPO Internal  
Search terms: v-horn, noise free, vehicle

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	D1: CN 2493456 Y (LIU CAILIAN ) 29 MAY 2002 (29/05/2002) Abstract; Entire document	1-9
A	D2: US 8693708 B2 (STAR HEADLIGHT & LANTERN CO., INC) 08 APRIL 2014 (08/04/2014) Col 1, line 25-Col 2, line 49; Col 3, line 7- Col 4, line 24	1-9

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 03-11-2016	Date of mailing of the international search report 03-11-2016
---	--

Name and mailing address of the ISA/ Indian Patent Office Plot No.32, Sector 14, Dwarka, New Delhi-110075 Facsimile No.	Authorized officer Srinivasarao Reesu Telephone No. +91-1125300200
--	--

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2016/054367**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: 10  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
Because the said claim is not definitive.
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.