

HAZARD INDICATOR FOR A VEHICLE -

The present invention relates to a hazard indicator for a vehicle, and in particular to an indicator which in addition to indicating that a driver of the vehicle is applying a brake may also
5 indicate that a driver of the vehicle is intending to turn right or left and may also indicate that the driver of the vehicle requires assistance.

Collisions between successive vehicles in a particular direction of traffic account for quite a
10 number of car accidents. Although the maxim 'Keep at a safe distance' is a good principle to follow to avoid collision between vehicles going in the same direction, the minimum safe distance that should be
15 maintained between successive vehicles is often not maintained due to the fact that a leading vehicle is not provided with a braking warning system which satisfactorily warns the driver of a following vehicle to take sufficient and appropriate braking action in
20 time. It has been estimated that a spacing of six vehicle lengths between vehicles travelling at a speed

of approximately 60Km per hour or of nine vehicle lengths between vehicles travelling at a speed of approximately 90Km per hour will provide a sufficient distance between successive vehicles to substantially prevent this type of collision. However, this estimation is based upon experimentation and calculation which assumes that the driver of the following vehicle is prepared to acknowledge and respond appropriately to the operation of the brake lights of the leading vehicle. If the driver of the following vehicle is not in a position to learn of the braking action of the leading vehicle at all times, then such collisions between vehicles would still have a chance to take place for vehicle spacing distances greater than the estimated safety distance. The driver of the following vehicle is obliged to pay attention to a number of other factors besides the status quo of the leading vehicle, such as conditions of the lateral lanes, the road conditions, which all together would greatly reduce the active attention of the driver of the following vehicle in response to an immediate warning signal of the braking action of the leading vehicle unless the said driver puts aside all other matters of interests regarding the operation of a vehicle and concentrates solely on what the leading

vehicle is doing at that particular point in time. The driver's preparedness in response to the braking indication of the leading vehicle would be further reduced by taking into account such distractions as fatigue, passenger disturbance, and the sceneries on the road-side; so it can be said that the braking action to be taken by a driver in response to the braking indication of a leading vehicle is mostly done in a state of sudden recognition thereof.

10 Authoritatively conducted tests have shown that there is on average a time lag of the order of 0.8--1 seconds for an ordinary driver to react in response to sudden information as compared to continuously monitored information, with variations due to personal alertness and actual status quo of the driver. For the driver of
15 a vehicle travelling at a speed of, for example, 40 Km per hour, during this average time lag of 0.8--1 seconds, the vehicle would have travelled forward a further distance of 20--25 m, which distance is almost half as
20 far as the estimated safety distance. It may therefore be concluded that a time lag of as short a period as 0.8--1 seconds for the driver of a vehicle to effect an immediate braking action in response to the braking action of a vehicle in front of the driver could result
25 in a collision between the vehicles if the vehicles were

not spaced originally at a safe distance. The situation may become a matter of life or death, and so it should become clear that admittedly to keep at a safety distance is a good policy to avoid longitudinal collisions, yet a means to provide with the soonest possible warning signals of a vehicle executing a braking action in driving to the drivers of following vehicles, even a fraction of a second faster, would also help a great deal to prevent vehicle collisions.

10 Then the question lies in how to keep the driver informed as soon as possible, or even instantly of the braking signal of the leading vehicle, exclusive of the sixth sense, it is common sense that human perception is derived essentially from visual contact, gustatory
15 sense, sense of hearing, taste and tactile senses. For a driver driving a vehicle, he can only keep himself informed of the traffic conditions by means of visual observation and the sense of hearing. The sense of hearing is largely confused by virtue of the segregation
20 of the body of the car, and therefore an audio braking warning system for vehicles is not recommended because the warning sound released becomes indistinguishable from usual horns, and moreover, the loudness of such a warning sound will be greatly reduced before reaching
25 the ears of the drivers of following vehicles due to

the number of vehicles usually present on a road. In addition, it is not easy to tell the direction from which a warning sound comes when there is a number of vehicles on the road. Therefore visual faculty is the primary source for detection of specific circumstances for the drivers. If ever a vehicle is provided with a strong alarm signal system that will act to unambiguously draw the attention of the drivers of following vehicles while starting the application of the brakes to the vehicle, the objective of keeping them instantly informed of the given leading vehicle on the point of taking braking action will be fulfilled accordingly.

Although the red brake light warning system as provided conventionally on vehicles indicates to a following vehicle that the respective vehicle is in the progress of braking, the location of such red brake lights is often in a relatively conspicuous position on the vehicle such that the driver of a following vehicle can have difficulty in seeing the operation of the brake lights. The perspective range of the driver of the following vehicle can be very well compared to a screen, and the red tail light indicator will surely become the focus of attention if placed on a blank screen in the absence of all other objects. When however the surroundings of such a single light signal from a light indicator are

added with the profiles of the body of the car, other traffic bodies, roads, roadside backgrounds and are painted with colors, then it is evident that the signal from the warning light indicator would become grossly suppressed owing to the complicated mix-up with the surrounding objects and configurations. For vehicles which have red bodies or are painted red at the rear it is even more difficult to distinguish from a position rearward of the vehicle the operation of the red brake lights. The situation is even worse at night when the red tail light of a vehicle is switched on. Although the brake lights are usually brighter than the tail lights, it can sometimes be difficult and can take some time for the driver of a following vehicle to determine when or whether the brake lights of the leading vehicle comes in sight of the following vehicle after they have already been switched on for a period of time. Failure to recognize an active braking warning signal of a leading vehicle in time will place the driver of the following vehicle together with the vehicle itself and the passengers in a very precarious position indeed.

The present invention relates to an electronic indicator for a vehicle whereby the shortcomings of the brake warning indicators as used on conventional

vehicles, which brake warning indicators often fail to warn drivers of following vehicles, are overcome, the shortcomings being their inconspicuousness and liability to become indistinguishable with an active night warning lamp at night.

The main object of the present invention is to provide a readily recognizable braking alarm indication in the midst of the complicated surrounding profiles, views and color-bound configurations within the visual scope of the drivers of the vehicles that follow a given leading vehicles thus provided in day-time. Said braking alarm indication is basically different from the night warning lamp as ordinarily provided on vehicles when being driven in the evening or at night so as to keep drivers of following vehicles instantly or as soon as possible informed of the braking action that is being taken by the leading vehicle so as to take necessary braking action accordingly without affecting the visual scope of the drivers of the following vehicles.

The present invention further relates to an electronic indicator for a vehicle which, in addition to giving an indication of the braking of the vehicle, gives at least a visual indication that the driver of the vehicle requires assistance, such as in the event of an accident, road robbery or whenever rescue is required.

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The present invention accordingly provides an electronic braking alarm indicator for automobiles comprising a plurality of bulbs each positioned to light one of the letters S, T, O, P, S on a display screen, said first bulb lighting the first letter S, said
5 second bulb lighting the letter T, said third bulb lighting the letter O, said fourth bulb lighting the letter P, and said fifth bulb lighting the last letter S, a voltage source for lighting said bulbs, first and second switches connected between said voltage source and said plurality of bulbs, unidirectional current means
10 connected to said switches and said bulbs to light said first, second, third and fourth bulbs upon closing of said first switch and to light said first, third and fifth bulbs upon closing of said second switch to light up the command of either STOP or SOS on said display screen.

15 The present invention further provides an electronic braking alarm indicator for automobiles comprising a plurality of bulbs, each positioned to light one of the letters S, T, O, P, S on a display screen, said first bulb lighting the first letter S, said second bulb lighting the letter T, said third bulb lighting the letter
20 O, said fourth bulb lighting the letter P, and said fifth bulb lighting the last letter S, a voltage source for lighting said bulbs, first and second switches connected to said voltage source, said first switch connected to operate with a foot brake of the automobile, first unidirectional current means connected in line
25 from said first switch to said first and third bulbs, second unidirectional current means connected to said switches, flashing means connected to said second unidirectional current means and to said plurality of bulbs, third unidirectional current means connected to said fifth bulb and said first and third bulbs, said
30 second switch connected to said fifth bulb and through said third unidirectional means to said first and third bulbs.

Preferably the screen is further associated with the direction indicators, one indicator being disposed towards the left, and the other indicator being disposed towards the right, of the screen respectively, each
5 indicator being associated with a respective light source which is disposed in the housing.

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

10 Figure 1 shows in perspective the external arrangement of an electronic indicator according to a preferred embodiment of the present invention;

Figure 2 shows a cross-sectional view of the electronic indicator of Figure 1 taken along the
15 direction A'-A of Figure 1; and

Figure 3 shows an arrangement of the electronic circuit of an electronic indicator according to a preferred embodiment of the present invention.

Figure 1 shows a perspective view of an embodiment
20 of the present invention. The electronic indicator includes a demonstration screen 1, a pair of supports 2 and relevant electronic circuits (not shown). Screen 1 is arranged in combination with supports 2 as a single unit the arrangement being adapted for attachment to a
25 vehicle at a position on the rear part of the vehicle such that it will not obstruct the rearward view of a

driver. The position of attachment may be varied according to the respective size and model of the vehicle, and it may be on the rear bumper or inside the rear window provided that such an arrangement will in no way obstruct the view of a driver. The demonstration screen 1 points to the rear of the vehicle to enable observation of the screen by drivers of following vehicles.

As indicated in Figure 3, the demonstration screen has disposed inside it seven bulbs, and has on the surface of its rearwardly pointing face, patterns such that when the respective bulb is lit, light shows through the respective pattern so as to show a visual signal to the driver of a following vehicle. The screen 1 has on its surface two direction arrows one of which points to the right of the screen and the other of which points to the left of the screen with each arrow being arranged on the right or left side of the screen respectively. There is also provided on the surface of the screen the word STOPS which is disposed between the two direction arrows. The arrows and the letters of the word STOPS will not illuminate except when the vehicle on which the screen is disposed is making turns, braking, subjected to robbery or mechanical faults, that is to say, the demonstration screen 1 appears

blank to drivers of following vehicles under normal conditions when no bulbs in the electronic indicators are switched on and thus it presents no baffling effects for such other drivers concerned.

5 Referring to Figure 2 demonstration screen 1 is composed of, for example, a reflective acrylic board 11, a hood 12, bulbs 13 (of which only one is shown) and a light converging letter body 14 . The light converging letter body 14 has on its surface the patterns
10 of right and left direction arrows and the characters STOPS, which are preferably red or golden yellow in color, which may be adhered on the interior face of the reflective acrylic board 11, such that the letters of the word STOPS or the direction arrows correspond to
15 the respective bulb 13 such that each character may be clearly seen from the outside of the reflective acrylic board 11 rearwardly of the vehicle when the respective bulb 13 is switched on. When the respective bulb 13 is turned off, the respective letter of the word
20 STOPS or the respective arrow direction will disappear fromt the view of the driver of the following vehicle forthwith so as to leave a blank screen.

In order to give indication of the vehicle turning left (<-----), turning right (----->), or braking
25 (STOP) or of an emergency (SOS) on the demonstration

screen, the appropriate bulbs 13 are switched on behind the appropriate arrows or letters on the demonstration screen.

As shown in Figure 3 one terminal of each of the
5 bulbs 361 and 367, which bulbs correspond to the left turn arrow and the right turn arrow respectively, is connected to the respective switch 37 or 38 and the other terminal of each bulb 361 and 367 is connected to ground. Switches 37 and 38 are also connected to power
10 source B+ by way of oscillator 30. When the left or right turn bulb 361 or 367 respectively is flashing, due to the flow of current from power source B+ through oscillator 30, thence through the respective switch 37 or 34, the respective arrow on the screen 1 will likewise appear to
15 flash in synchronism.

As shown in Figure 3, switch 31 corresponds to a switch which is actuated by application of the foot brake of the vehicle, whereas switch 32 is preferably a push-button switch which is provided in order to indicate that
20 the driver requires assistance in a case of emergency. When switch 31 is switched on due to application of the foot brake, current will go to point A by way of switch 31 and supply the power required for the oscillation of oscillator 34 via diode 331. The oscillator 34 serves to
25 control the movement of the joint 351 of the relay 35.

The current at point A is applied to one terminal of each of the bulbs 362, 363, 368 and 365 and passed through bulbs 363 and 365, bulbs 363 and 365 corresponding respectively to the letters 'T' and 'P' on the demonstration screen 1, and also bulbs 362 and 364 bulb 362 and 364 corresponding respectively to the letter 'S' and 'O' on the demonstration screen 1 by way of diodes 332 and 333 respectively, with a second terminal of each of the bulbs 363, 365 and 366 commonly joined to the terminal 351 of the relay 35. According to this arrangement such illumination of bulbs 362, 363, 364 and 365 causes illumination of the combined letters STOP, meaning the vehicle so provided with the indicator is braking due to conduction of current through switch 31.

Thus when the foot brake switch 31 is switched on, bulbs 362, 363, 364 and 365 will flash on and off repeatedly by virtue of the operation of the oscillator 34 and the relay 35. The word STOP will be transmitted as a flashing signal when the foot brake is applied so as to warn drivers of following vehicles that the brake is being applied to the vehicle. It can be seen that bulb 366 remains unlit because of absence of current passing through bulb 366 due to the reverse bias of diodes 334 and 335.

In case of emergency, emergency pushbutton switch

32 can be switched on thereby allowing current from the power source B+ to drive oscillator 34 and relay 35 by way of diode 334 and also pass through bulb 366, bulb 366 corresponding to the letter 'S' on the demonstration screen 1 and bulbs 362 and 364, each bulb corresponding to the letter 'S' or 'O' on the demonstration screen 1 respectively, by way of the diode 335. Thus when emergency switch 32 is switched on, the signal 'SOS' will appear on demonstration screen 1 due to illumination of bulbs 362, 364 and 366 each bulb corresponding to the three single letters 'S' 'O' and 'S' respectively. Signal 'SOS' will be transmitted as a flashing signal because the bulbs 362, 364, and 366 will all flash as a result of the operation of the oscillator 34 and the relay 35, whilst bulbs 363 and 365 will remain unlit due to absence of voltage at point A owing to the reverse bias of the diode 331.

As regards the dimension of the demonstration screen 1, the principle is that it shall achieve in a clear and appropriate demonstration of the signals described herein.

The demonstration screen 1 may, for example, have the dimensions 390mm long, 80 mm high and 85 mm in depth thereby resulting in good efficiency in practical applications.

The present invention provides a highly efficient means for instantly showing a warning signal for indicating to drivers of following vehicles that the leading vehicle is braking at that point in time, in order that those drivers can react to take similar braking actions so as to avoid longitudinal collision between vehicles. The signal 'STOP' that is illuminated on the demonstration screen once the vehicle is braking will be transmitted as continuous flashes that will constitute the most conspicuous and eye-catching focus of attention for the drivers of the following vehicles. Use of the base letters STOPS on the demonstration screen together with corresponding circuits to display two different warning signals namely 'STOP' and 'SOS', which signals are both acknowledged internationally, is unique and serves to provide as a striking warning device. The invention may be used in the event of road hijacking, in addition to being used as a signal for help when a vehicle so provided with the invention has broken down, and therefore the present invention can be said to be of great value to vehicles. Although the circuits adopted for use in the invention are known per se, the present invention should not be therefore prejudiced since it can definitely be of great value from an innovatory point of view.

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CLAIMS:

1. An electronic braking alarm indicator for automobiles comprising

a plurality of bulbs, each positioned to light one of the letters S, T, O, P, Son a display screen, said first bulb lightin the letter S, said second bulb light-
5 ing the letter T, said third bulb lighting the letter O, said fourth bulb lighting the letter P, and said fifth bulb lighting the last letter S,

a voltage source for lighting said bulbs,

10 first and second switches connected between said voltage source and said plurality of bulbs,

unidirectional current means connected to said switches and said bulbs to light said first, second, third, and fourth bulbs upon closing of said first
15 switch and to light said first, third and fifth bulbs upon closing of said second switch to light up the command of either STOP or SOS on said display screen.

2. A electronic braking alarm indicator as
20 claimed in Claim 1, wherein said unidirectional current means are diodes.

3. An electronic braking alarm indicator as claimed in Claim 1, or Claim 2, further comprising
25 flashing means connected to said switches and to said bulbs.

4. An electronic braking alarm indicator as claimed in any preceding claim wherein
30 said unidirectional current means are diodes positioned for nominal current flow in the direction



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from said voltage source through said first switch to said first and third bulbs, and from said voltage source through said second switch to said first and third bulbs.

5 5. An electronic braking alarm indicator as claimed in Claim 4, wherein

 said diode from said second switch is positioned as a reverse bias diode means between said first switch and said fifth bulb to prevent lighting of said fifth
10 bulb upon closing of said first switch.

 6. An electronic braking alarm indicator for automobiles comprising

 a plurality of bulbs, each positioned to light one
15 of the letters S, T, O, P, S on a display screen, said first bulb lighting the first letter S, said second bulb lighting the letter T, said third bulb lighting the letter O, said fourth bulb lighting the letter P, and said fifth bulb lighting the last letter S,

20 a voltage source for lighting said bulbs,
 first and second switches connected to said voltage source, said first switch connected to operate with a foot brake of the automobile,

 first unidirectional current means connected in
25 the line from said first switch to said first and third bulbs,

 second unidirectional current means connected to said switches,

 flashing means connected to said second unidirectional current means and to said plurality of bulbs,
30 third unidirectional current means connected to

 said fifth bulb and said first and third bulbs,

 said second switch connected to said fifth bulb and through said third unidirectional means to said first and third bulbs.

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7. an electronic braking alarm indicator as claimed in Claim 6, wherein

said flashing means includes
oscillation means and relay means serially
5 connected to flashingly illuminate the command of either
STOP or SOS on said display screen.

8. An electronic braking alarm indicator
substantially as hereinbefore described with reference
10 to and as shown in the accompanying drawings.

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