

(21) Application No 9205647.2

(22) Date of filing 13.03.1992

(71) Applicant  
**Michael Anthony Jones**  
48 Victoria Road, North Windermere, Cumbria,  
LA23 2DS, United Kingdom

(72) Inventor  
**Michael Anthony Jones**

(74) Agent and/or Address for Service  
**Michael Anthony Jones**  
48 Victoria Road, North Windermere, Cumbria,  
LA23 2DS, United Kingdom

(51) INT CL<sup>5</sup>  
B62D 15/02

(52) UK CL (Edition L)  
B7H HNK  
G1N NAHJC N1B2 N3V7 N7T1A  
U1S S1826

(56) Documents cited  
GB 2246331 A AU 900049020 A US 4017977 A

(58) Field of search  
UK CL (Edition K) B7H HNK, G1N  
INT CL<sup>5</sup> B62D 15/02  
Online database: WPI

(54) Towing vehicle and trailer position display

(57) Mounted on the tow-ball bracket 4 of the towing vehicle is a sensor unit 5 having a rotary shaft 22 which is linked to the trailer by a rod 19 so that the angular position of the shaft 22 depends on the angle between the towing vehicle and the trailer. The shaft 22 is connected, via gearing, to a further shaft carrying a rotor arm which sweeps over an array of fixed contacts each of which corresponds to one of a row of lights in the display unit 2 to which the sensor unit 5 is connected. When reversing, the display unit 2 is used by the driver of the vehicle if the trailer is not adequately visible, thus making a difficult manoeuvre much easier.

FIG. 1.

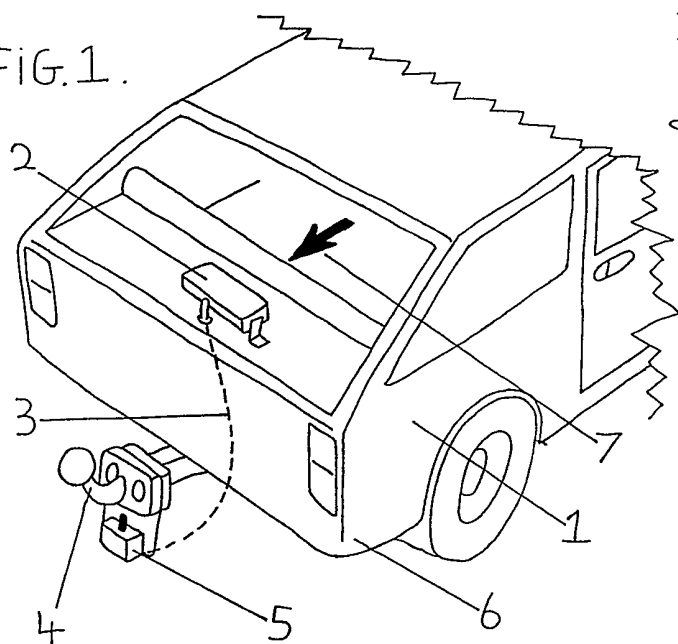
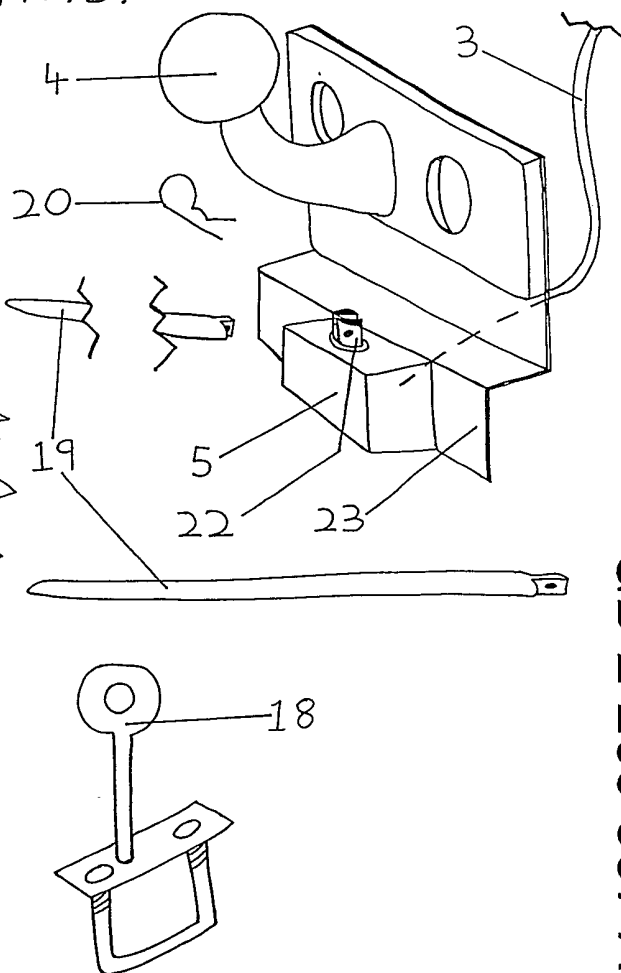


FIG. 3.



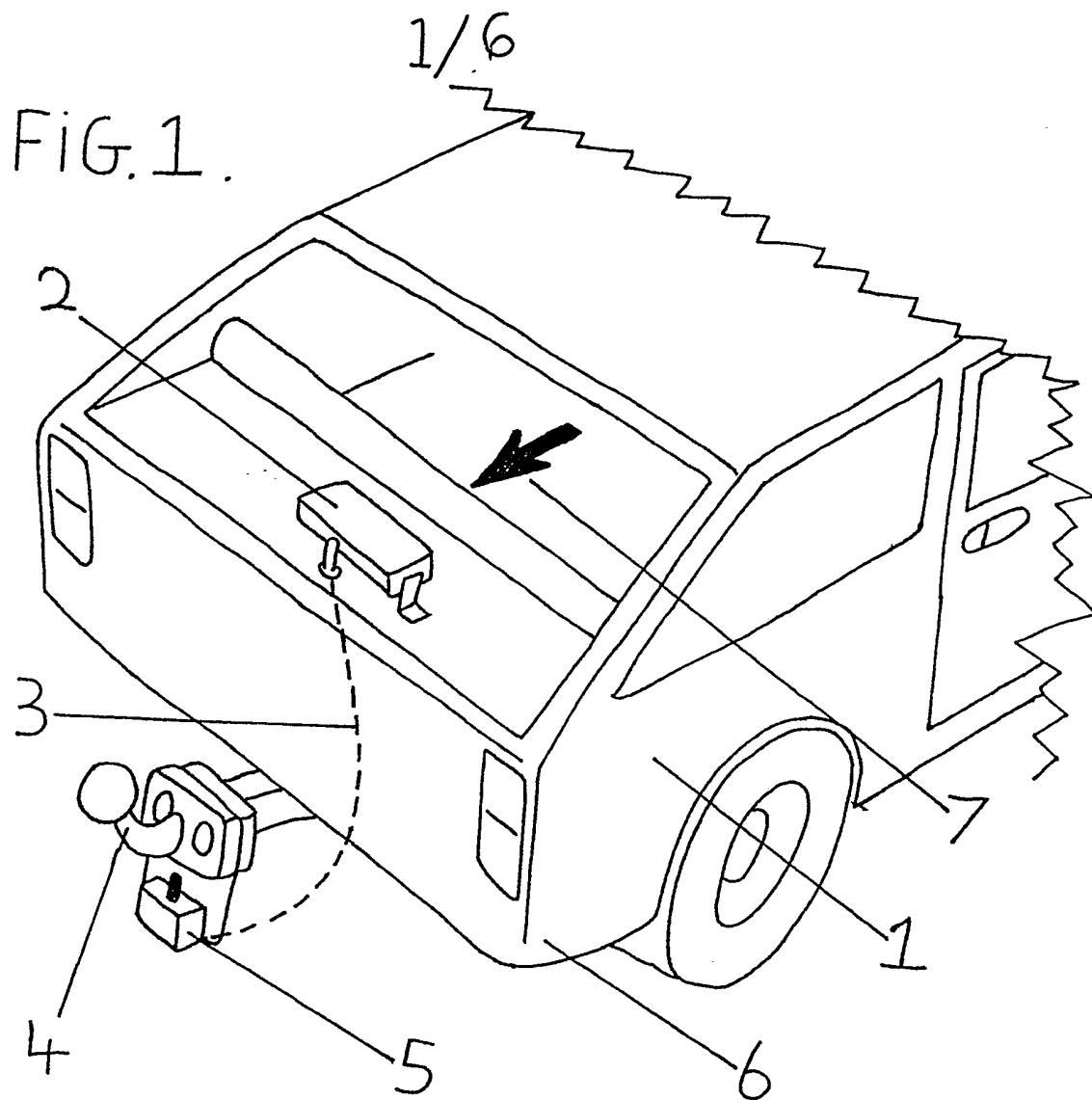
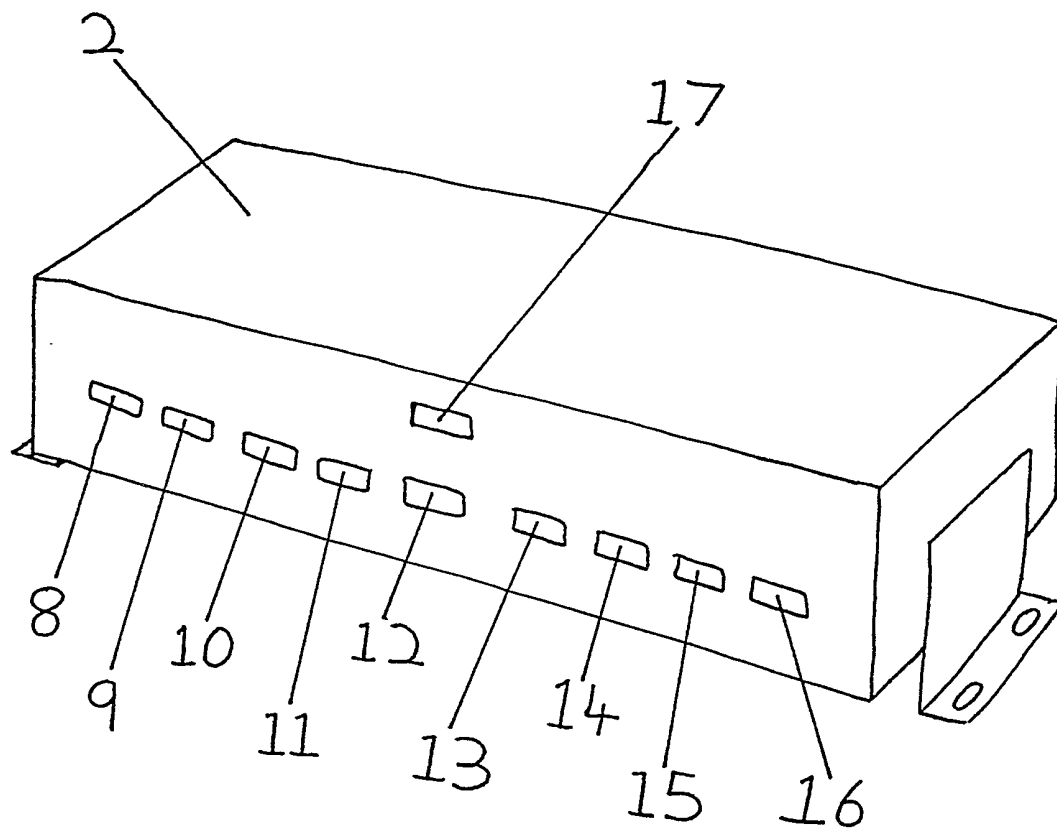


FIG. 2. 2/6



3/6

FIG. 3.

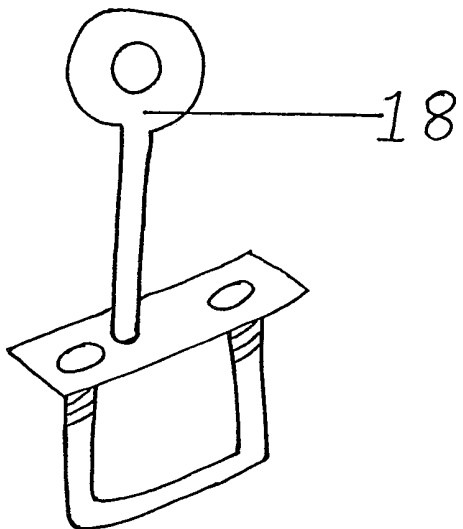
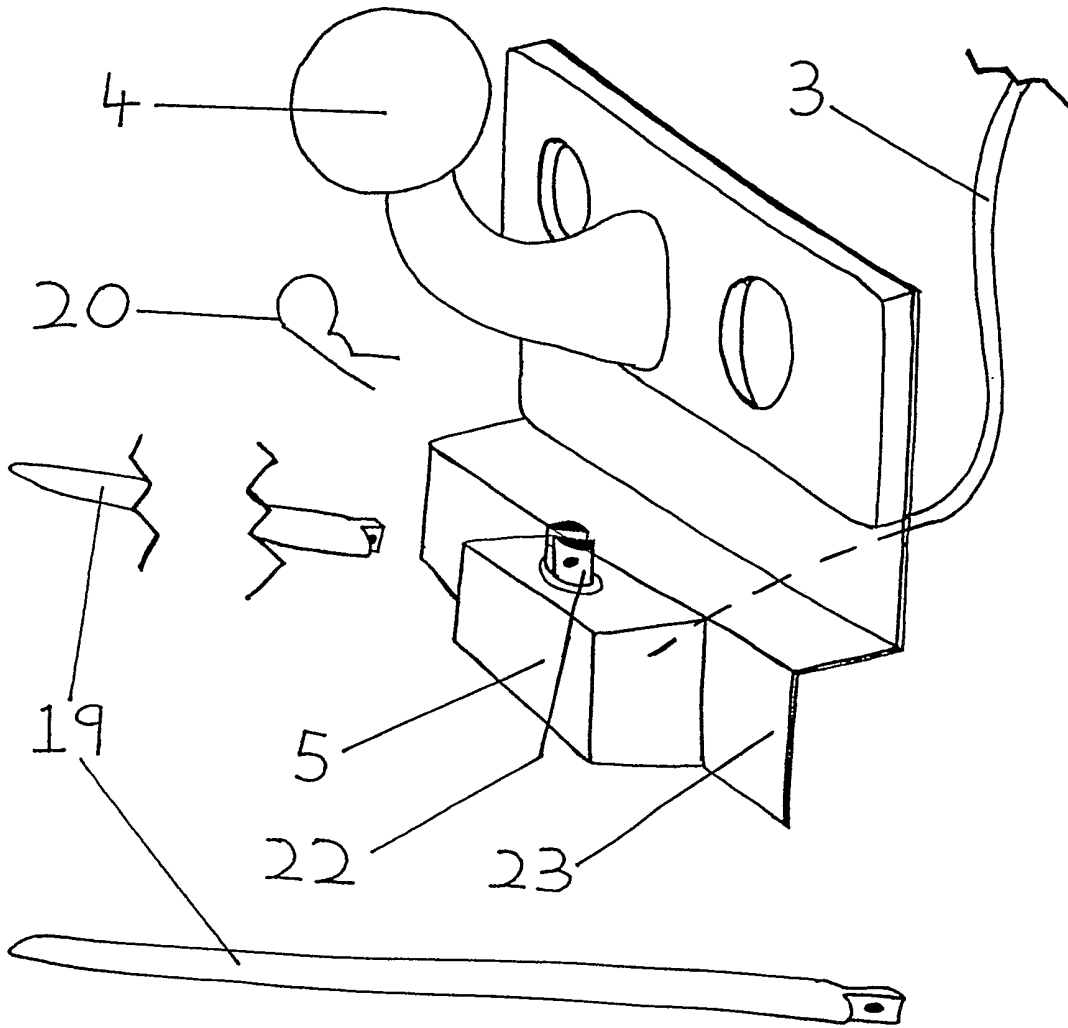


FIG. 4 4/6

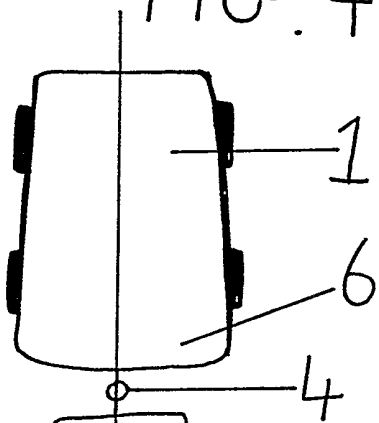


FIG 5

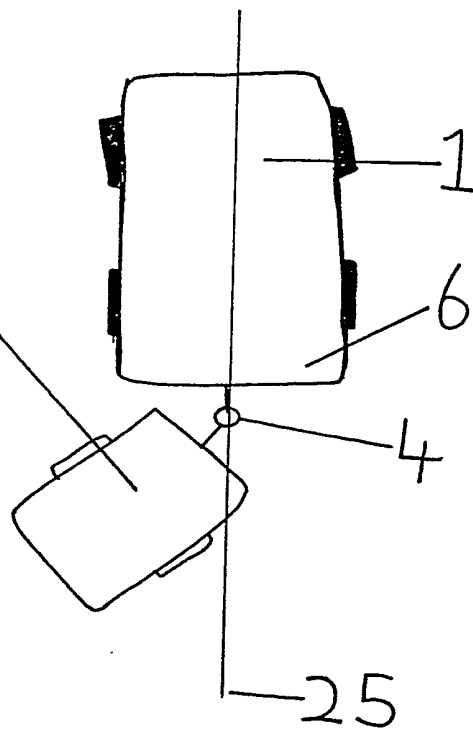
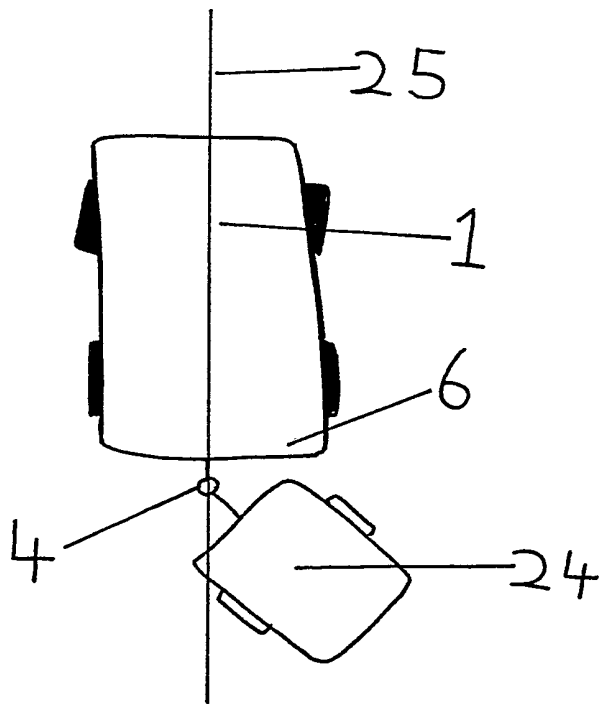


FIG 6



5/6  
FIG. 7.

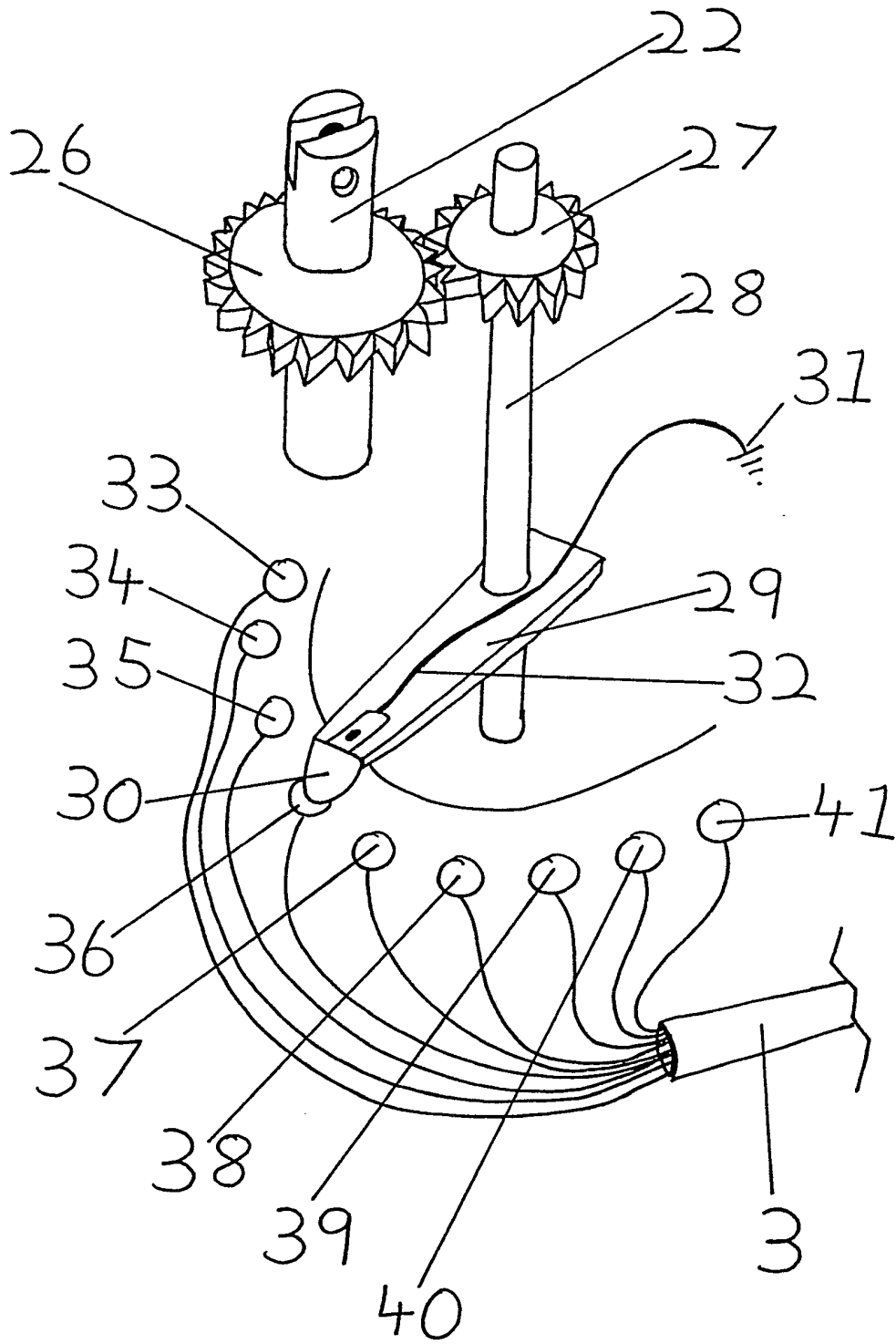
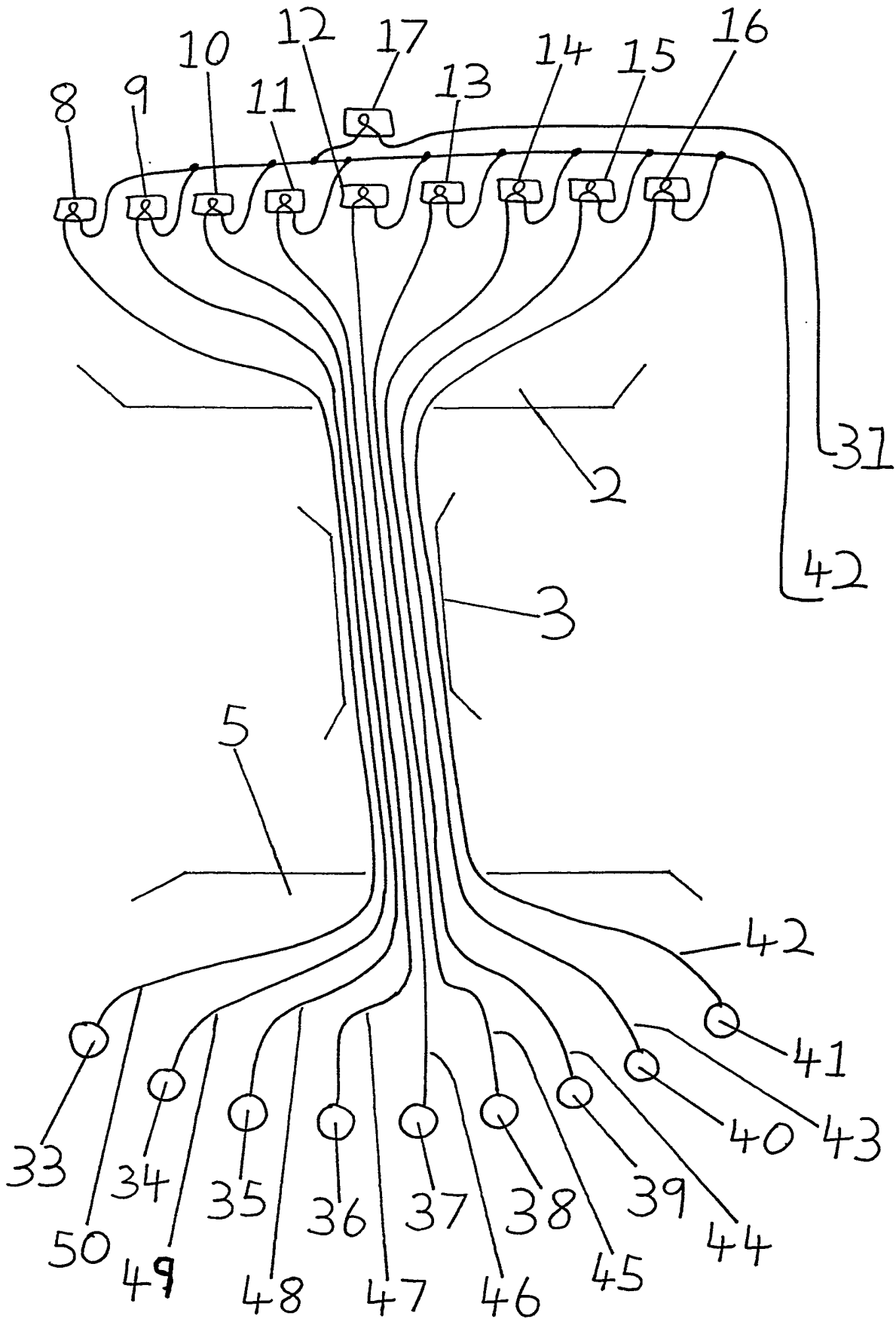


FIG. 8. 6/6



## MOTOR VEHICLE TRAILER POSITION DISPLAY

I, Michael Anthony Jones of Forty-eight Victoria Road North, Windermere, Cumbria, of British nationality do hereby declare the invention, for which I pray that a patent may be granted to me, the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to:- Motor Vehicle trailer position display.

Trailers are commonly owned vehicles and vary greatly in use, size and shape. Often, it is difficult for the driver of a vehicle with trailer connected to reverse backwards because of poor trailer visibility from the driver's seat. This situation often arises when the towing vehicle has no rear windows and only wing mirrors or if the trailer connected is very small. Trailer visibility is also impaired in bad weather and darkness.



According to the present invention there is provided a battery operated visual display that indicates the position of a trailer in relation to a towing vehicle which it is connected to. Therefore when the driver of a vehicle with a trailer connected is reversing backwards and the trailer is not adequately visible by the driver, the display shows which way the trailer is pointing. Thus enabling the driver to reverse and position the trailer in a controlled fashion.

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

Fig 1 shows in perspective a rear view of a vehicle with display unit and sensor unit fitted.

Fig 2 shows in perspective the drivers view of the front of the display unit.

Fig 3 shows in perspective the sensor unit and trailer connecting linkage.

Fig 4 shows an above plan view of vehicle with trailer connected.

Fig 5 shows an above plan view of vehicle with trailer connected going round a left hand corner.

Fig 6 shows an above plan view of vehicle with trailer connected going round a right hand corner.

Fig 7 shows in perspective the inside components of the sensor unit.

Fig 8 shows a wiring diagram for the sensor unit and the display unit.

Referring to Fig 1, this shows where display unit 2 and sensor unit 5 are fitted on a vehicle. The vehicle 1 and rear of 6 is fitted with display unit 2 mounted on the inside rear parcel shelf and sensor unit 5 bolted to tow-ball bracket 4, the dotted line is showing the wiring loom 3 connecting display unit 2 and sensor unit 5. The view of the front of the display unit 2 from the driver's seat is shown by the arrow 7.

Referring to Fig 2, this shows the front of the display unit 2 which has fitted ten lights. Light 17 illuminates to show the middle of the display unit 2, only one of the lights 8, 9, 10, 11, 12, 13, 14, 15, and 16 can illuminate at one time, these lights show the vehicle driver to which side the trailer is pointing to.

The sensor unit 5 shown in Fig 3 is mounted to the bracket 23 which is mounted with the tow-ball 4 to vehicle 1. The sensor unit 5 is connected from vehicle 1 to trailer by the connecting rod 19 which is inserted through the trailer connecting rod locator 18 which mounts to the front of a trailer near the hitch. Connecting rod 19 is then connected to the sensor spindle 22 by the pin 20.

With the sensor unit 5 and display unit 2 installed into vehicle 1 referring to Fig 4, the trailer 24 is in line with vehicle 1, the direction line 25 shows this. In this in line position on the display unit 2 light 12 would be illuminated along with light 17 which is on constantly when in use.

In Fig 5 the vehicle 1 and trailer 24 are in a left hand turn position. In this position one of the lights 13, 14, 15, or 16 on the display unit 2 would be illuminated depending on the angle of trailer 24 in relation to towing vehicle 1.

Fig 6 shows vehicle 1 and trailer 24 in a right hand turn position. In this position one of the lights 8, 9, 10, or 11 on the display unit 2 would be illuminated depending on the angle of trailer 24 in relation to towing vehicle 1.

In a slight left hand turn light 13 on the display unit 2 would be illuminated, in a very tight right hand turn light 8 on the display unit 2 would be illuminated.

When in operation, display unit 2 only has two lights illuminated, one is always light 17, the other can be any of lights 8, 9, 10, 11, 12, 13, 14, 15 or 16 depending where trailer 24 is in relation to towing vehicle 1.

Fig 7 shows the inside components of the sensor unit 5. Sensor spindle 22 is fixed to gear 26. Gear 27 is fixed to operating shaft 28. Gear 26 and gear 27 are permanently in mesh. Arm 29 is fixed to operating shaft 28. When sensor spindle 22 is turned, the meshing gears 26 and 27 move the arm 29 by rotating the operating shaft 28. Fastened to the end of arm 29 is contact pad 30. Contact pad 30 is connected to wire 32 which goes along arm 29 to earth 31 behind the operating shaft 28. Wire 23 has extra length between rear of arm 29 and earth at 31 to give some slack to allow the arm 29 to be moved without restriction. Contact pad 30 connects with pads 33, 34, 35, 36, 37, 38, 39, 40 and 41 in turn when arm 29 is moved. When contact pad 30 is in contact with one of the contact pads 33, 34, 35, 36, 37, 38, 39, 40 or 41 an electrical contact is made from contact pad to contact pad 30 then through wire 32 to earth at 31. Only one contact pad can be in contact with contact pad 30 at one time.

Referring to Fig 8, this shows a wiring diagram for display unit 2 and sensor unit 5. In the display unit 2 the lights 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 are supplied with positive electrical current from positive wire 42. Wire 31 is a permanent earth wire for light 17 on display unit 2. The contact pads 33, 34, 35, 36, 37, 38, 39, 40 and 41 in the sensor unit 5 are connected individually to the lights 8, 9, 10, 11, 12, 13, 14, 15, and 16 in display unit 2 by the wires 42, 43, 44, 45, 46, 47, 48, 49 and 50 which are in the wiring loom 3. As a positive electrical current is supplied to each of the lights 8, 9, 10, 11, 12, 13, 14, 15 and 16 in order for any one of them to illuminate an earth connection must be made. For an earth connection to be made for 'example' light 8 in display unit 2, contact pad 33 in sensor unit 5 would have to be touching contact pad 30 on arm 29. An earth connection would then be made as contact pad 30 is connected to earth at point 31 via wire 32. Contact pad 33 is connected to light 8 via wire 50 in wiring loom 3.

CLAIMS

1. A vehicle trailer position display comprising a sensor unit connected to a display unit. The sensor unit being attached to the rear of the towing vehicle and also the front of the trailer connected.

2. A vehicle trailer position display as claimed in 1 wherein the sensor unit operates the display unit inside the towing vehicle.

3. A vehicle trailer position display as claimed in claim 1 and claim 2 wherein the sensor unit and display unit are battery powered.

4. A vehicle trailer position display as claimed in claim 3 wherein both sensor unit and display unit require battery voltage to operate.

5. A vehicle trailer position display as claimed in claim 3 and in claim 4 wherein the display unit shows if the trailer is pointing either to the left 'nearside', and to what angle left, or to the right 'offside', and to what angle right or straight in line with the towing vehicle.

6. A vehicle trailer position display substantially as described herein with reference to Figures 1 - 8 of the accompanying drawings.

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number  
 GB 9205647.2

**Relevant Technical fields**

- (i) UK Cl (Edition K ) B7H (HNK); G1N  
 (ii) Int Cl (Edition 5 ) B62D 15/02

**Search Examiner**

J L TWIN

**Date of Search**

15 SEPTEMBER 1992

**Databases (see over)**

- (i) UK Patent Office  
 (ii) ONLINE DATABASE: WPI

Documents considered relevant following a search in respect of claims 1 TO 5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2246331 A (BUCKLEY)	1-5
X	AU 49020/90 A (LUCAS)	1-5
X	US 4017977 (LIGHT ET AL)	1-5



Category	Identity of document and relevant passages	Relevant to claim(s)

**Categories of documents**

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).