Cyclist Detection Device

[This document exemplifies how to interpret the search request, the preparation and gathering of keywords and patent classes and conducting a sample search including comments of how and why using search statements. This document is by no means meant to be the “best” or “perfect” search, there is no such thing. It just exemplifies a solid search that would have passed the candidate.]

0. The search request as presented to the examinee:

This document claims priority as of 2013-01-02

Filing date: 2013-12-30

Publication date: 2014-05-31

Description

Cyclists often get injured by colliding with side doors of vehicles when occupants of the vehicles open the side doors without paying attention to cyclists moving towards the vehicles. The invention provides a warning device for warning vehicle occupants of passing cyclists.

The warning device comprises first sensor for detecting a cycle moving towards the vehicle and second sensor arranged on the inner door handle for detecting a vehicle occupant’s hand approaching the inner door handle. The warning device also comprises at least one warning element. The warning element is arranged on the inner door handle. Instead of being arranged on the inner door handle the warning element can be arranged in a different position in the interior of the occupant vehicle. Moreover, the warning device can comprise a plurality of warning elements being arranged in different positions in the interior. The warning element is arranged in the interior of the vehicle. The warning element serves for outputting at least one warning signal to the occupant, for example, the driver in dependency on the signals provided by the sensors. The warning element can be connected to the control unit.

If the first sensor detects that a cyclist moves towards the occupant vehicle, and if the second sensor detects that driver or occupant is about to open the side door, the control unit sends at least one actuation signal to the warning element, the actuation signal effecting the output of the warning signal. The warning signal serves for warning the driver not to open, or move further, the side door, so that a collision of the cyclist with the door can be avoided. The warning device calls the driver’s attention to the cyclist moving towards the vehicle.

The warning element can comprise at least one lighting element, for example, a LED (light emitting diode) so that the warning element is, for example, designed to output the warning signal in the form of at least one blinking light. The warning element may comprise at least one speaker element so that the warning element, for example, outputs the warning signal in the form of an acoustic signal. Said acoustic signal can be a buzzing alarm. The warning element can comprise at least one actuator so that the warning element outputs the warning signal as vibrations of the inner door handle. The vibrations of the inner door handle are effected by means of the warning element to call the driver’s attention to the cyclist approaching the occupant vehicle.

Claims

1. A warning device for a vehicle, the warning device comprising:

(a) a first sensor located on an exterior rear-view mirror of the vehicle for detecting a cyclist moving towards the vehicle;

(b) a second sensor located on an inner door handle for detecting that a occupant is about to open a side door of the vehicle; and,

c) a warning element for outputting a warning signal to the occupant of the vehicle if the first sensor detects a cyclist moving towards the vehicle and the second sensor detects that the occupant is about to open the side door.

2. The warning device according to claims 1,

characterised in that the warning element is arranged in the interior of the vehicle.

3. The warning device according to any one of the preceding claims,

characterised in that the warning element is designed to output the warning signal in the form of vibrations of the inner door handle.

4. The warning device according to any one of claims 1 to 2, characterised in that the warning element is a lighting element.

5. The warning device according to claim 4, characterised in that the lighting element comprises at least one LED.

Your client’s latest development is affected by this patent. They ask you to find potentially invalidating prior art against this document.
Develop a search strategy to find prior art against this patent.

1. Technical Background

1.1. Preparation / Background

What issues should have been spotted when deciding what to search for?

Claim 6 is the broadest claim, but since it would be anticipated by any parking sensor, the focus of the search should be directed to the subject matter of claim 1.

What should be searched for?

A warning device for a vehicle which outputs a signal to the occupant of the vehicle if a first sensor of the device detects an object moving towards the vehicle and a second sensor of the device detects that the occupant is about to open a side door of the vehicle.

As a claim chart:

A warning device for a vehicle, the device comprising:

- A first sensor located on the exterior of the vehicle
- A second sensor located on the inside of the vehicle
- A warning element outputting a warning signal conditionally according to signals from both first and second sensors.

1.2. Example description of verbalization of reasoning on case:

I start the search be carefully reading the text and taking note of the dates (priority date 2013-01-02; filing date 2013-12-30 and publication date 2014-05-31). For the purpose of an prior art for opposition search the priority date defines the borderline before which any pertinent prior art (patent or non-patent) must have been available (i.e. published) to the public. The filing date would only play a role if the patent in question was a European patent, then according to Rule 54(3) also filings between the priority date and the filing date could play a role if also filed at the EPO. These I would search for in a second step if the general search didn’t return anything promising. For the purpose of this exam this is not feasible.

The description describes a warning system for vehicle drivers to make them aware of approaching (bi-)cyclists. To achieve this there are two sensors, one that monitors the surroundings of the driver’s door and one that monitors whether the driver intends to open his or her door. If both monitoring devices meet their triggering conditions one of several mentioned warning signals will be put out to alert the driver: a flashing light, or a buzzing sound, or a vibrating door handle.

Independent claim 1 claims a combination of the mentioned sensors devices and a warning device. Dependent claims 2 to 5 only claim different embodiments of the warning signal. The exact nature of the sensors is not mentioned, neither for the exterior one in the rear-view mirror, nor the interior one in the vicinity of the door handle. I would assume the outer one to be either optical (camera) or based on wave detection (radar, lidar, etc) and the inner one a capacity sensor.

For the present purpose and in the interest of the limited time, I will only search for the subject matter of the first claim and without differentiation of the nature of the different sensors.

2. Classification

- IPC / CPC

I do a quick and dirty search for “dooring”, a term that is used to describe the above mentioned situation of a car driver carelessly opening the door of their car without checking for other traffic, in the Espacenet classification page search box.

Alternatively I could also enter “vehicle door collision sensor” or similar to get a result to start from. This can and will of course have to be adjusted to get more precise results but that can be done in the proper search.

This is what the search returns:

Symbol	Classification and description
G08G 1/00	**Traffic control systems for road vehicles** (arrangement of road signs or traffic signals E01F 9/00 {; automatic vehicle control B62D})
G06V 20/00	**Scenes; Scene-specific elements** (control of digital cameras H04N 5/232)
B60W 2754/00	**Output or target parameters relating to objects**
B60W 2554/00	**Input parameters relating to objects**
G08B 21/00	**Alarms responsive to a single specified undesired or abnormal condition and not otherwise provided for**
B60W 2556/00	**Input parameters relating to data**
B60W 30/00	**Purposes of road vehicle drive control systems not related to the control of a particular sub-unit, e.g. of systems using conjoint control of vehicle sub-units** {, or advanced driver assistance systems for ensuring comfort, stability and safety or drive control systems for propelling or retarding the vehicle (anti-lock brake systems [ABS] B60T 8/00)}
B60Q 9/00	**Arrangements or adaptations of signal devices not provided for in one of the preceding main groups,** {e.g. haptic signalling}

Although certainly not comprehensive, it is a start to work from. The classification search feature only returns IPC / CPC classification on the main group level; to find more detailed results you have to open the main group tabs and find more info. It is also a very good idea to check the descriptions of the sub-classes (boxes labelled “D” at the end of the sub-group definitions). E.g. although the definition seems to indicate that this is not the best place to begin with, there is a cross-reference in G08G1/16, pointing to B60Q1/525, B60W30/08 and G01S13 which seem promising to follow up on.

After some time following these leads and also trying another search statement into the box “automobile warning sensor” bringing up B60Q9 as the most promising starting point.

This is a list of useful classification (IPC and CPC). If I had more time I would also check Japanese F-terms and FI and possibly also the now defunct USCla. Some databases also offer German classification DEKla which in the context of automobile searches is also promising.

I could of course also start on a quick and dirty search using either unusual keywords (like “dooring” or “emportierage” (see final history)) or the “finder” (instead of searcher) approach to quickly gain several good starting places to look for further / better classification.

The classes will have to be appropriately truncated in searching - this will very much depend on the quality of the search terms: the more precise they are the more general can the classification searched be. This is a matter of trying out and re-assessing the search steps.

While reviewing classification in Espacenet I will use also the additional information offered by the EPO as host, like “D”efinition buttons (see above).

G01S RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES
G01S13 Systems using the reflection or reradiation of radio waves, e.g. radar systems; Analogous systems using reflection or reradiation of waves whose nature or wavelength is irrelevant or unspecified [2020-01]
G01S13/88 . Radar or analogous systems specially adapted for specific applications (electromagnetic prospecting or detecting of objects, e.g. near-field detection, G01V3/00) [2013-01]
G01S13/93 .. for anti-collision purposes [2013-01]

G01S15 Systems using the reflection or reradiation of acoustic waves, e.g. sonar systems [2013-01]
G01S15/88 . Sonar systems specially adapted for specific applications (seismic or acoustic prospecting or detecting G01V1/00) [2013-01]
G01S15/93 .. for anti-collision purposes [2013-01]

G01S17 Systems using the reflection or reradiation of electromagnetic waves other than radio waves, e.g. lidar systems [2021-01]
G01S17/88 .. Lidar systems specially adapted for specific applications [2013-01]
G01S17/93 .. for anti-collision purposes.

B60Q ARRANGEMENT OF SIGNALLING OR LIGHTING DEVICES, THE MOUNTING OR SUPPORTING THEREOF OR CIRCUITS THEREFOR, FOR VEHICLES IN GENERAL
B60Q1/00 Arrangements or adaptations of optical signalling or lighting devices
B60Q1/26 . the devices being primarily intended to indicate the vehicle, or parts thereof, or to give signals, to other traffic (means for the lighting or illuminating of aerials, e.g. for purpose of warning H01Q1/06) [2018-02]
B60Q1/50 .. for indicating other intentions or conditions, e.g. request for waiting or overtaking

B60Q1/52 … for indicating emergencies (braking indicating devices B60Q1/44, portable emergency signal devices B60Q7/00) [2013-01]
B60Q1/525 …. indicating risk of collision between vehicles or with pedestrians (using video cameras B62D1/00; radars designed for anti-collision purposes between land vehicles or between land vehicle and fixed obstacles G01S13/931; anti-collision systems for road vehicles G08G1/16)

B60Q9/00 Arrangements or adaptations of signal devices not provided for in one of the preceding main groups, e.g. haptic signalling [2013-01]
B60Q9/001 . Alarm devices when the motor is stopped and the lights are on [2013-01]
B60Q9/002 . for parking purposes, e.g. for warning the driver that his vehicle has contacted or is about to contact an obstacle (warning arrangements in garages E04H6/42) [2013-01]
B60Q9/003 .. using physical contactors, e.g. arms that trigger alarm upon contact with obstacle [2013-01]
B60Q9/004 … using wave sensors (radar designed for anti-collision purposes between land vehicles or between land vehicles and fixed obstacles G01S13/931) [2013-01]
B60Q9/005 … using a video camera [2013-01]
B60Q9/006 …. using a distance sensor [2013-01]
B60Q9/007 .. providing information about the distance to an obstacle, e.g. varying sound [2013-01]
B60Q9/008 . for anti-collision purposes [2013-01]

B60R VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR
B60R21/00 Arrangements or fittings on vehicles for protecting or preventing injuries to occupants or pedestrians in case of accidents or other traffic risks
B60R21/01 Electrical circuits for triggering passive safety arrangements, e.g. airbags, safety belt tighteners, in case of vehicle accidents or impending vehicle accidents (electrical circuits for transmission of signals between steering wheel and the vehicle itself B60R16/027; for electrically actuating belt retractor locking means B60R22/343)
B60R21/013 .. including means for detecting collisions, impending collisions or roll-over
B60R21/0134 … responsive to imminent contact with an obstacle , e.g. using radar systems

It looks like B60W is not really relevant to the search. Classification here requires control, which is not a feature of the exam question. Though it was a feature of the relevant citation that was classified there (family including WO2014198803), i.e. the actuators in the control system Fig 3 may control the operation of the door. This one should at best be “bonus”.

B60W CONJOINT CONTROL OF VEHICLE SUB-UNITS OF DIFFERENT TYPE OR DIFFERENT FUNCTION; CONTROL SYSTEMS SPECIALLY ADAPTED FOR HYBRID VEHICLES; ROAD VEHICLE DRIVE CONTROL SYSTEMS FOR PURPOSES NOT RELATED TO THE CONTROL OF A PARTICULAR SUB-UNIT [2021-08]

G06V IMAGE OR VIDEO RECOGNITION OR UNDERSTANDING
G06V20 Scenes; Scene-specific elements (control of digital cameras H04N5/232) [2022-01]
all new [2022-01] and Warnings
Groups G06V20/56, G06V20/58, G06V20/582, G06V20/584, G06V20/586 and G06V20/588 are incomplete pending reclassification of documents from group G06K9/00.
All groups listed in this Warning should be considered in order to perform a complete search.

G06V20/50 . Context or environment of the image [2022-01]
G06V20/52 .. Surveillance or monitoring of activities, e.g. for recognising suspicious objects (recognising microscopic objects G06V20/69) [2022-01]
G06V20/53 … Recognition of crowd images, e.g. recognition of crowd congestion [2022-01]
G06V20/54 … of traffic, e.g. cars on the road, trains or boats [2022-01]
G06V20/56 .. exterior to a vehicle by using sensors mounted on the vehicle [2022-01]
G06V20/58 … Recognition of moving objects or obstacles, e.g. vehicles or pedestrians; Recognition of traffic objects, e.g. traffic signs, traffic lights or roads [2022-01]
G06V20/582 …. of traffic signs [2022-01]
G06V20/584 …. of vehicle lights or traffic lights [2022-01]
G06V20/586 …. of parking space [2022-01]
G06V20/588 … Recognition of the road, e.g. of lane markings; Recognition of the vehicle driving pattern in relation to the road [2022-01]
G06V20/59 .. inside of a vehicle, e.g. relating to seat occupancy, driver state or inner lighting conditions [2022-01]
G06V20/593 … Recognising seat occupancy [2022-01]
G06V20/597 … Recognising the driver's state or behaviour, e.g. attention or drowsiness

G08G TRAFFIC CONTROL SYSTEMS (radar or analogous systems, sonar systems, lidar systems specially adapted for anti-collision purposes G01S13/93, G01S15/93, G01S17/93) [2018-08]
G08G1/00 Traffic control systems for road vehicles (arrangement of road signs or traffic signals E01F9/00 ; automatic vehicle control B62D) [2017-08]
G08G1/16 . Anti-collision systems (road vehicle drive control systems for predicting or avoiding probable or impending collision otherwise than by control of a particular sub-unit B60W30/08) [2013-01]
G08G1/161 .. Decentralised systems, e.g. inter-vehicle communication [2013-01]
G08G1/162 … event-triggered [2013-01]
G08G1/163 … involving continuous checking [2013-01]
G08G1/164 .. Centralised systems, e.g. external to vehicles [2013-01]
G08G1/165 .. for passive traffic, e.g. including static obstacles, trees [2013-01]

G08G1/166 .. for active traffic, e.g. moving vehicles, pedestrians, bikes [2013-01]
G08G1/167 .. Driving aids for lane monitoring, lane changing, e.g. blind spot detection [2013-01]
G08G1/168 .. Driving aids for parking, e.g. acoustic or visual feedback on parking space [2013-01]

● other classification

Derwent Manual Codes

none found

F-terms

USCla

3. Concepts

●Keywords

door, driver* door, side door, passenger door, fahrertuer*, tuer*, tür*, beifahrertuer*, seitenteil*, portiere (du chauffeur)

car, auto, automobil*, vehicle, voiture*

dooring, emportierer, emportierage

alarm, alert, warn,

cyclist*, bicyl*, motorcycl*, bike, fahrrad*, fahrraed*, radfahrer*, bicyclett*, velo, cycliste*

sensor, sensing, detect*

(OR PROXIM+, CYCLIST+, BIKE+, VEHICLE+, OBJECT+, PERSON+, PEDESTRIAN+)

Example reasoning about choice of database, strategy, etc.

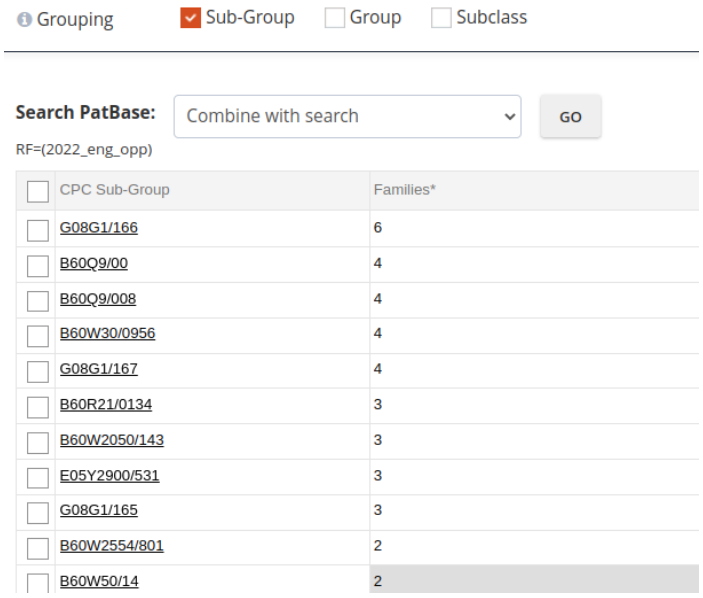
I will use PatBase as my patent database because that is the one I'm most familiar with and whose interface, commands and search fields I know best.

As the technical topic of the patent is not within my expertise I choose an two-part approach to familiarise myself with the technical surrounding and also already gain some insight into the classification and some keywords to start from.

Therefore I start by an "unusual keyword" approach, using English "dooring" and French "emportier*" as search terms. This approach is not comprehensive but promising to find text and classification to start with in cases where there are keywords that are descriptive or pre-defined (like ISO / DIN norms, scientific nomenclature or similar). This will find a lot of noise that is easily discarded for the few nuggets.

As a second step I do a "finder vs searcher" search, combining all features of the patent into one search statement. As above this is far from comprehensive but also returns at least some hits to learn from and loot.

This is the top of the classification analysis, outlining some good starting points. The definitions will be shown at mouse-over and the classes can be transferred into the search by checking the box in front of them.



CPC Sub-Group	Families*
G08G1/166	6
B60Q9/00	4
B60Q9/008	4
B60W30/0956	4
G08G1/167	4
B60R21/0134	3
B60W2050/143	3
E05Y2900/531	3
G08G1/165	3
B60W2554/801	2
B60W50/14	2

Then I earnestly start collecting keywords and classes. In the interest of time and since this part of the exam is about compiling a search strategy and not about the quality of the results I will do some regular sampling to assess and control my progress (also see comments in history).

Keywords are chosen from the few languages I know, for others I have to hope that they will also be found via their family members. With truncation you have to be carefully to not pick up too much noise, e.g. I will not truncate “velo” with “zero or any” symbol “*” to not pick up things like “velocity” or similar. For first tries and hits see history.

Checking on S16 and S17 using fulltext and advanced highlighting for speed of assessment. It turns out that not truncating “door” costs possible hits in S17. Also I take the opportunity to check on the classes used. Here I also find G06V20/58 for image recognition which I didn’t have before. S16 on the other hand is too general without adding the door. So I combine S10 with another search for the doors in S11.

Intermediate checks show that there is a number of families found that are rather big and the keywords are often spread over several members and not in one document. Therefore I use the “spub” command which leads to all the keywords and / or classification to be restricted to the same family member.

After several more checks and search steps I will have a closer look at S29. It is very promising but I can only use documents published before the priority date which is 2013-01-02. I therefore restrict to those.

I will also run another search based on more generalised classification (at main group level instead of sub group) and more

restricted keywords (based on S11, binding “vehicle” and “door” closer together. First I have to add the truncation symbol to “door”. Otherwise I use the same sequence of search steps as before.

When studying the results I find families 12660221, 71931937 and 71366658 very interesting, although the two latter ones are published too late (selected from search step S29) for the purpose of this search. Nevertheless they can be useful in a citation search, perhaps some older useful state of the art has been cited in one of their search reports.

Here my search history, complete with comments:

- 1) // all comments referring to the search step by using "Sn" (0)
- 2) tac=(dooring or emportier*) (127)
- 3) // S2 = unusual keyword approach, quick check for classification / additional keywords (0)
- 4) tac=(door and (car or automobil* or vehicle) and bicycl* and warning and sensor*) (32)
- 5) // S4 = finder vs searcher approach, quick check for classification / additional keywords (0)
- 6) RF=(2022_eng_opp) (15)
- 7) // S6 = promising hits found in <10 minutes by checking of S2 and S4; ready for classification analysis and additional keywords (0)
- 8) CPC=(G08G1/166 OR B60Q9/008 OR G08G1/167 OR B60R21/0134 OR B60W2050/143 OR G08G1/165 OR B60W50/14) (30225)
- 9) // S8 = classes picked from analysis of S6 (0)
- 10) tac=(car or cars or automobile* or auto or voiture* or macchina) (2413052)
- 11) tac=(((car or cars or automobile* or auto or voiture* or macchina) near (door or tuer* or portier*)) or autotuer*) (75672)
- 12) 8 and 10 (5186)
- 13) 8 and 11 (162)
- 14) // S10 to S13 = I try different combinations of keywords and classes to have a reservoir to later choose from (0)
- 15) tac=(cyclist* or bicyl* or motorcycl* or bike* or fahrrad* or fahrraed* or radfahrer* or bicyclett* or velo or cycliste*) (242365)
- 16) 12 and 15 (178)
- 17) 13 and 15 (9)
- 18) // S17 = this seems to be too narrow, will sample S16 and S17 and try to see why there are so few hits in S17 (0)
- 19) tac=(door* or tuer* or portier* or autotuer*) (1933590)
- 20) 8 and 10 and 19 (383)
- 21) // I will combine S10 and S19 also with keywords for warning and the newly found G06V20/58 (0)
- 22) spub=(8 and 10 and 19) (332)
- 23) // S22 = classification and keywords from both S10 and S19 have to be present together in at least one member of the family (0)
- 24) tac=(warning or warnung* or alert* or alarm* or avertiss* or (mise_en_garde)) (1492979)

- 25) sc=(G06V20/58 or G01S13/93 or G01S15/93 or G01S17/93) (30908)
- 26) // S24 and S25: I keep keywords and classification apart to be able to later untangle them again if I need to (0)
- 27) spub=(8 and 10 and 24) (2304)
- 28) spub=(8 and 10 and 19 and 24) (204)
- 29) 28 and 25 (23)
- 30) // S29 is the first result I will analyse in depth (0)
- 31) 29 and epd<20130102 (10)
- 32) // S31 these families have at least one member published before the priotity date of the patent under scrutiny (0)
- 33) tac=(((car or cars or automobile* or auto or voiture* or macchina) near (door* or tuer* or portier*)) or autotuer*) (81329)
- 34) CPC=(G08G1 OR B60Q9 OR B60R21 OR B60W2050 OR B60W50) (183969)
- 35) spub=(34 and 33 and 24) (261)
- 36) 35 and 25 (14)
- 37) 36 not 29 (5)
- 38) // S37 = removal of earlier result 29 (0)
- 39) 37 and epd<20130102 (2)
- 40) // S39 = published before priority date (0)
- 41) fn=(71931937 or 12660221 or 71366658) (3)
- 42) cta 41 (69)
- 43) // S42 = both forward and backward citations of promising families (0)
- 44) 42 and epd<20130102 (36)
- 45) 44 not (29 or 36) (36)
- 46) // S4 = published before priority date; S45 removing those seen before (none here) (0)