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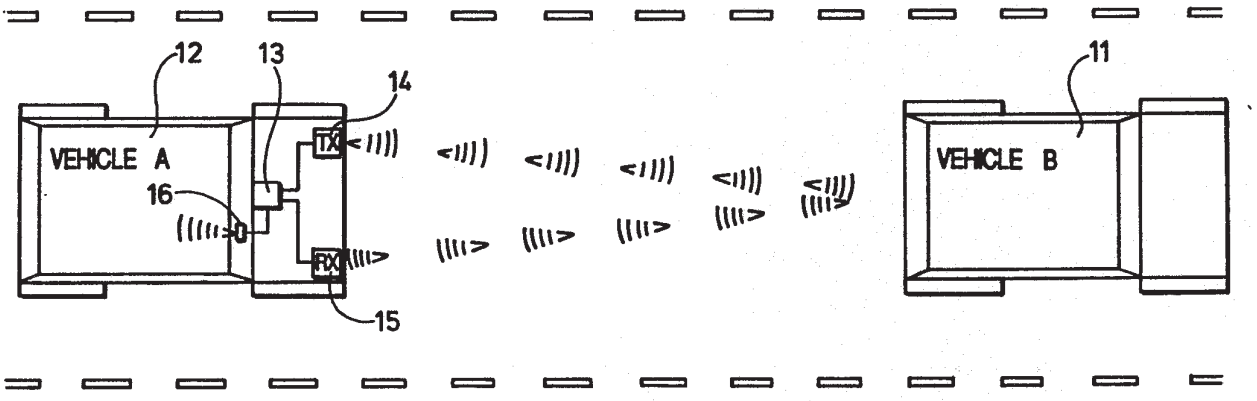

(57) Abstract

Remote sensing apparatus for a vehicle (12) comprises means (13, 14, 15) for determining the separation between a vehicle and an object or other vehicle (11) in the region in front of the said vehicle sensitive to the speed of the vehicle for determining a threshold distance value which is greater at higher speeds, and means for comparing the thus determined distance of the detected vehicle with the said threshold value and for generating a warning signal (16) if the said determined distance is less than the said

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REMOTE SENSING APPARATUS FOR A VEHICLE

The present invention relates generally to remote sensing apparatus for a vehicle, and particularly to such apparatus for providing a proximity signal to assist safe driving.

Various prior art systems for detecting the presence of remote obstacles have been described in the literature. Such obstacle detecting systems make use of some form of electromagnetic radiation transmitted from a system on board the vehicle with a suitable receiver for detecting reflected signals coming from objects in the path of the vehicle. One such system is described in U.S. Patent 4,447,800 which relates to an obstacle detector mounted on a motor vehicle and having a light emitting element (in this case a semi-conductor infra-red laser) which transmits a light signal through an appropriate optical transmission system into the region immediately ahead of a vehicle. The optical signal thus transmitted is of a wavelength which is outside the spectrum of solar energy wavelengths or, if within the spectrum, in a region where the solar energy at this frequency is of very low intensity at ground level. An optical receiving system receives part of the light reflected from an obstacle in front of the vehicle and passes it to an optical filter which has a pass band width the central wavelength of

which is coincident with that of the wavelength of the light signal transmitted by the optical transmission system. The output of the filter is converted by a photo detector to a corresponding electrical signal for processing by a data processor in order to determine the distance of the vehicle from the object in front of it. Means for calculating the height of the obstacle and the relative speed between the obstacle and the vehicle carrying the detecting system are also provided. Other known systems include that described in French Patent 2,576,126 which is an optical device for measuring the distance separating two moving objects travelling along the same path, again having optical transmitting means and receiving means working to detect light reflected from an object in front of the vehicle. In this case, however, it is envisaged that each vehicle would be provided with a reflective coded band at the back which reflects the incident light in a particular manner back to the vehicle behind so that it can process the received light with an electronic circuit in order to obtain information relating to the distance separating the two moving objects and the relative speed between the two vehicles. Another proposal using remote sensors is that disclosed in U.S. Patent 4,694,295 which includes an ultrasonic transducer and an infra-red sensor: This system, however, is adapted to direct the beam of radiation into the quadrant immediately behind and to one side of the vehicle to cover the region

which is not readily visible through the rear view mirror so as to avoid the necessity for those who are not physically one hundred per cent from having to rotate the body and the head to establish the presence of an overtaking vehicle in the so-called "blind spot" of the rear view mirror.

More generally, of course, many different remote sensing systems are known for various purposes, including air borne radar used in military and civilian aircraft to detect the presence of other aircraft in the vicinity of the aircraft carrying the radar set. All of these known systems, however, fail to provide a solution to the problem which is encountered in road driving, namely that of ensuring that drivers will maintain a safe distance behind a preceding vehicle travelling in the same direction. Especially when the driving conditions become congested there is a considerable temptation for drivers to maintain an inadequate separation between their vehicle and the one in front, especially if this may lead to the interposition of an overtaking vehicle. Strict guidelines are laid down by the Ministry of Transport based on the average time taken by a vehicle to come to rest from any given speed, and the distance travelled by the vehicle while the driver reacts to an emergency situation, which have been promulgated as recommended minimum vehicle separation distances at certain speeds in order to allow

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