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Vehicle Tracking and Disabling Using WIMAX

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***Abstract*—**We see in the present day scenario that the Global positioning system (GPS) has been an effective tool to track the vehicle. However the adverse part of it is that it can only track a vehicle's position. Our present work provides a better platform to track and disable a vehicle using wireless technology. In our system we embed a microcomputer which monitors the series of automotive systems like engine, fuel and braking system. The external USB modem is connected with the microcomputer to provide 24 x 7 internet accesses. The microcomputer is synchronized with the owner's multimedia mobile by means of a software tool "REMOTE DESKTOP". A unique username and password is provided to the software tool, so that the owner can only access the microcomputer through the internet on owner's mobile. The key fact is that our design is placed such that it is known only to the owner.

***Keywords*—**GPS, Microcomputer, Multimedia Phone, REMOTE DESKTOP, USB Modem.

I. INTRODUCTION

LOSING things is an aggravation that has been almost unanimously experienced. Our goal is to create a system that allows people to find and disable the vehicle that have been tagged. In ancient days when a vehicle is lost people used to track the information about their vehicles based on the information given from witnesses and their car registration number. But technology is advancing in a quite faster rate. We cannot predict the future but we can predict what tools and technologies will succeed the present one.

Many vehicles are lost every year. According to estimates [1], 745,000 vehicles were lost in United Kingdom in a 10-months period between November 2007 and September 2008. India too reported 70,000 vehicles lost in 2008[2]. In Australia, 300,000 vehicles were reported lost to the police in 2008[3].

II. OBJECTIVE

Our design used to prevent unauthorized users from initially operating a vehicle and to gradually decelerate and stop a vehicle in-transit under certain pre-determined conditions. The systems can be designed to be activated for specific situations, such as unauthorized access or use of a vehicle; discovery of security violations; vehicle entry into unauthorized areas; prevention of engine damage due to detected system failures; crisis or emergency situations; and

Mandatory maintenance needs. Our present proposed model utilizes a combination of various technologies that are embedded in such a way that, it tracks and disables a streaming vehicle in progress via owner's multimedia mobile phone or a personal computer. The vital part in our system is that, the integral course of action is buttoned up within a fraction of seconds.

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III. OUR PRESENT WORK

The system can be divided into following:

1. Interfacing
2. Accessing
3. Positioning & Disabling

1. Interfacing:

Our vehicle disabling systems provide authorized users at remote locations the ability to prevent an engine from starting, prevent movement of a vehicle, and to stop or slow an operating vehicle. It allows a dispatcher or other authorized personnel to gradually decelerate a vehicle by downshifting, cutting down the fuel supply to the engine, or applying the braking system from a remote location. Our systems provides no advance notification to the driver that the vehicle disabling is about to occur. After stopping a vehicle, microcomputer will lock the vehicle's brakes or will not allow the vehicle's engine to be restarted within a certain timeframe.

A. Interfacing of Braking System:

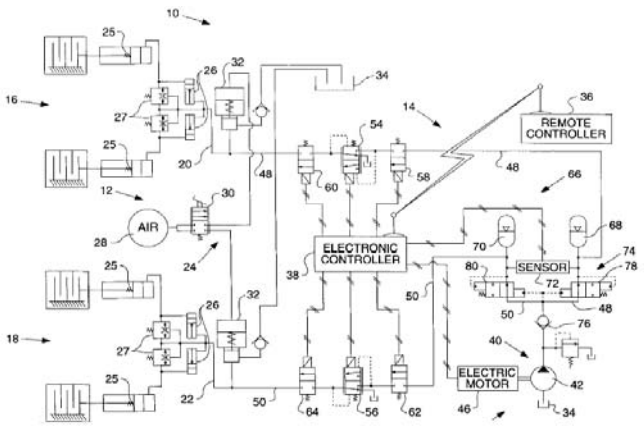

Fig. 1 The circuit diagram of frequency and remotely controlled braking system is shown above.

(a) Working Diagram:

A remotely controlled brake system is provided to permit braking control of a machine from a remote location while still permitting an operator located on the machine to control the braking function of the machine. Remote control is accomplished by providing a source of pressurized fluid on the machine with an electrically controlled proportional valve arrangement that is responsive to a remote signal to direct pressurized fluid to the brakes of the machine in parallel with

the pressure control being directed to the machine brakes by an operator input mechanism.

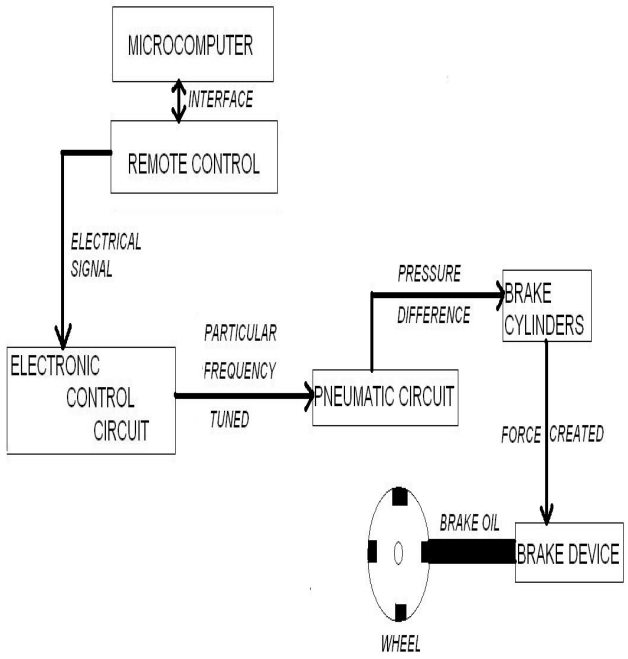

Fig. 2 Block diagram of a Remote Braking System

In one aspect of the present invention, a remotely controlled brake system is provided and adapted to control the brakes of a machine and operate in parallel with an onboard brake control. The brakes of the machine includes fluid pressure controlled brakes with an operator controlled pressure input arrangement operative to direct a pressurized fluid volume to the fluid pressure controlled brakes for actuation thereof[4].The remotely controlled brake system includes a source of pressurized fluid, an electrically controlled proportional fluid control valve arrangement disposed between the source of pressurized fluid and a connection with the pressurized fluid volume from the operator controlled pressure input arrangement, and an electronic controller operative to receive a signal from a remote location and deliver an electrical signal to the electrically controlled proportional fluid control valve arrangement[5].

B. Interfacing of Fuel System:

This mechanism provides a remote control for fuel line shut off that will permit a pursuit vehicle to shut off the fuel feeding to the engine of any number of vehicles within a predetermined radius at the same time and with only one movement of the control in the pursuit vehicle [6]. It consists of a mechanism adapted to be connected into the fuel line of an internal combustion engine of a vehicle between the fuel tank and the fuel pump, the aforesaid mechanism consisting of a two-piece vertically disposed metal receptacle that has its two sections screwed together on assembly. The uppermost one of the two piece receptacle contains an electric solenoid that is connected to an electric battery and to a signal receiver that receives its impulses from a transmitter [7]. The transmitter is controlled by the microcomputer. The transmitter is embedded with the microcomputer using certain coding mechanisms. The solenoid has a spring-loaded plunger that has its lower end extending down through a seal in the bottom of the uppermost one of the two-piece receptacle and on into openings in the wall of a horizontally disposed Y-shaped tube that is located in the lowermost one of the two-piece receptacle. The side of the lower portion of the plunger has an opening therein through which fuel will flow when this invention is inactive; the lower end of the plunger is adapted to enter an opening in the wall of the angularly disposed portion of the Y-shaped tube. This invention also has a blinking light connected to the aforesaid signal receiver in such a location as to be seen outside the vehicle containing this invention. This invention relates to the fuel lines of internal combustion engines; more particularly, to a remote control for shutting off the fuel flowing through the fuel lines to the engine.

(a) Fuel Shut-Off System:

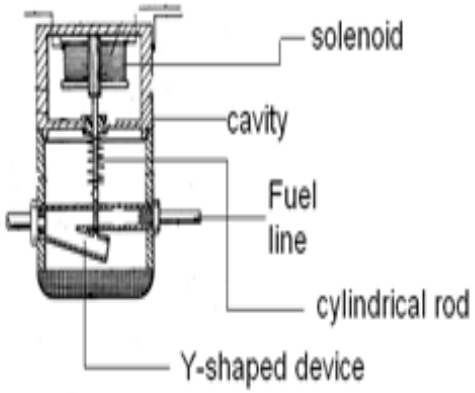

Fig. 3 Typical Remote Fuel Shut-Off System

(b) Working Diagram:

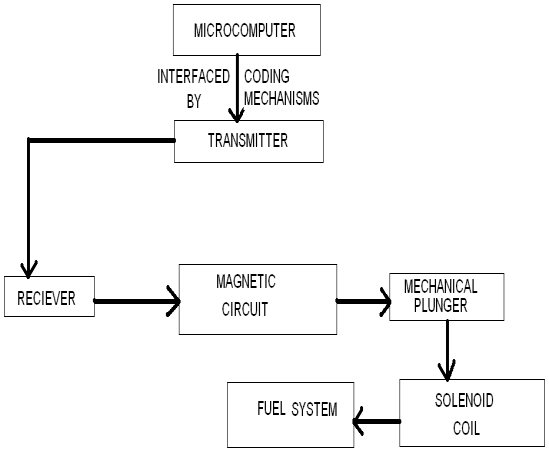

Fig. 4 Block Diagram of Remote Fuel Shut-Off System

2. Accessing:

Currently there are many types of network access services that are available. Cable and DSL broadband access services are two services whose popularity has increased greatly over the past few years. As a result, a great number of people and communities have been able to access the Internet. However, even as broadband systems have gained in popularity, there remain a large number of areas throughout the world that are unable to access broadband connectivity. DSL connectivity generally requires a central office, and DSL connections may generally only be made within short distances from the central office switch (i.e. less than four miles).

Due to the limitations associated with cable and DSL, various wireless access methods have been proposed and developed in an attempt to provide network access services to a greater number of people. In order to connect to a wireless access system, the host computer from which access is requested is required to be connected to a wireless modem. Wireless modems (also referred to RF modems) are generally comprised of an RF transceiver, a baseband chip used to modulate and demodulate received signals, a CPU, and an interface that allows for connectivity to the local host machine, and a memory store. The components of the modem operate so as to receive and transmit electromagnetic signals.

(a) Scope:

In our system we provide USB modem to the microcomputer providing 24 x 7 internet accesses. The software tool “REMOTE DESKTOP” is accessed from the user’s multimedia phone through the internet provided by the USB modem.

3. Positioning and Disabling:

a) Positioning:

When people talk about "a GPS," they usually mean a GPS receiver. The Global Positioning System (GPS) is actually a constellation of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails). Each of these 3,000- to 4,000-pound solar-powered satellites circles the globe at about 12,000 miles (19,300 km), making two complete rotations every day. The orbits are arranged so that at anytime, anywhere on Earth, there are at least four satellites "visible" in the sky. A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location. This operation is based on a simple mathematical principle called trilateration [8].

The method of calculating position for the case of no errors has been explained. One of the most significant error sources is the GPS receiver's clock. Because of the very large value of the speed of light, *c*, the estimated distances from the GPS receiver to the satellites, the pseudo ranges, are very sensitive to errors in the GPS receiver clock. This suggests that an extremely accurate and expensive clock is required for the GPS receiver to work. On the other hand, manufacturers prefer to build inexpensive GPS receivers for mass markets. The solution for this dilemma is based on the way sphere surfaces intersect in the GPS problem. It is likely the surfaces of the three spheres intersect since the circle of intersection of the first two spheres is normally quite large and thus the third sphere surface is likely to intersect this large circle. It is very unlikely that the surface of the sphere corresponding to the fourth satellite will intersect either of the two points of intersection of the first three since any clock error could cause it to miss intersecting a point. However the distance from the valid estimate of GPS receiver position to the surface of the sphere corresponding to the fourth satellite can be used to compute a clock correction.

b) Disabling of Vehicle:

In computing, the term remote desktop refers to software or an OS feature allowing graphical applications to be run remotely on a server, while being displayed locally. Remote desktop applications have varying features. Some allow attaching to an existing user's session (i.e. a running desktop) and "remote controlling" it in front of the user's eyes. Taking over a desktop remotely is a form of remote administration. It can also be explained as remote control of a computer by using another device connected via the internet or another network. Windows XP, Vista, windows 7 and Server 2003/2008 include Remote Desktop Services. Freeware remote desktop applications exist which are cross-platform and work various versions of Windows, Mac, and UNIX/Linux/BSD. The quality, speed and functions of any remote desktop protocol are based on the system layer where the graphical desktop is redirected. Software such as PC Anywhere, VNC and others use the top software layer to extract and compress the graphic interface images for transmission. Since the advent of cloud computing, remote desktop software can now be housed on USB hardware devices, allowing users to connect the device to any online PC and recreate their desktop via a connection to the cloud. This model avoids the problem with remote desktop software, which depends on the user's primary computer being switched on at the time when the user wishes to access it remotely. The common name for USB devices with the capacity to remotely recreate a user's desktop is "secure portable office.

Fig. 5 Remote Desktop for a Mobile phone

Fig. 6 A Typical Remote Desktop Connection

IV. WORKING PRINCIPLE OF VEHICLE TRACKING AND DISABLING

If the vehicle is lost it can be easily tracked and disabled. The vehicle can be tracked through the global positioning system. This tracking can be done with the help of GPS enabled mobile phone (multimedia phones). We can access the computer in the car with a help of software "REMOTE DESKTOP". The computer must be connected to all systems in the car such as its engine, fuel injector, ignition system, braking system, steering system, etc... The remote desktop should be installed to the car computer system. Initially we can access the car computer through the remote desktop. The system is implemented in such a way that it is hidden in order to prevent it from the view of the person driving the vehicle.. We may login the microcomputer with help of a unique username and a password .The remote desktop thereby gives us the access of the vehicle through the computer present in the car. If the vehicle has been tracked then we can issue command to the microcomputer (connected using a remote desktop) from a mobile phone. Upon receiving the commands the computer slowly locks all the system and makes the vehicle come to a standstill.

V. OVERALL PROCESS DIAGRAM

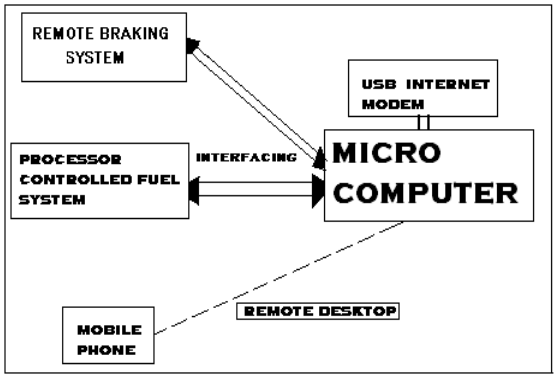

Fig .7 Block Representation of Vehicle Tracking and Disabling.

VI. ADVANTAGES

1. The system is reliable & quicker.
2. It's a onetime investment design.
3. No maintenance cost.
4. There is no chance of any anti-social activities.
5. More Economical.

VII. COST ANALYSIS

S.NO	COMPONENTS	COST(U.S DOLLARS)
1.	Micro Computer	400
2.	USB Modem	20
3.	Mechanical Interfacing circuits	150
4.	Multimedia Mobile Phone	150
	TOTAL	720

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