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FIRE DETECTION, CONTROL AND AUTOMATIC DOOR UNLOCKING SYSTEM FOR AUTOMOBILES

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I. ABSTRACT

During automobile fire accidents, the lives couldn't be saved because of the failure in opening the vehicle doors. There are systems available for the detection and control of fire accidents in automobiles but those systems are designed to detect the fire, warn the drivers and operate the fire extinguishers to control the fire. The system designed in this research work tends to unlock the vehicle door automatically along with alerting the driver with an alarm and supply fire extinguishers during automobile fire. Temperature sensor and smoke sensor are used to detect the fire and different motors are used to open the door and supply the fire extinguisher. The system works even if the battery fails or the electrical system fails or the door locked manually. Since separate system is installed for each door, in case if the system of a particular door fails, the passenger can be saved by the other door.

II. INTRODUCTION

Fire prevention mainly deals with employing effective design principles to curb operational interferences that may lead to fire outbreak. This may involve but not limited to choose of materials, materials geometry and form of orientation in relation to other materials. Fire minimization concerns itself with employing fire-resistant materials in locations where there is the likelihood of fire propagation. Most automobiles have fire resistant materials serving as firewalls to protect the passenger compartment from engine compartment fire. These firewalls are now perforated with openings to allow the flow of pipes, cables and wires not seen on older automobiles. Fire suppression aims at extinguishing active fire. Most fire suppression systems require some form of contact with the fire to be more effective. Engine compartment fires sometimes knock off the bonnet locking mechanism making fire suppression more difficult in automobiles. Toxicological effects of burning cars and the ability of egested fumes to prevent escape from fire environment and induce death have long been issues of grave concern. Many resources have been directed at passenger escape or rescue from automobile fire outbreaks, leaving costly cherished vehicles prone to thermal insults, which render motor vehicles useless in 20 minutes. Abandoned and stationary vehicles are often at the mercy of arsonists and rioters. Several standards have been enacted to date but the problem of automobile fire has not been fully addressed. Combustion is defined as aself sustaining chemical reaction between fuel and an oxidant evolving into heat, flame (light), smoke and fire gases. In the motor vehicle, the fuel in a combustion process may range from liquid/gaseous. fuels, transmission and engine oils, power steering and brake fluids, coolant and refrigerant, upholsteries, foams and plastic.

materials such as in dashboards, bumpers and wire insulations, tires, any material being conveyed by the vehicle and probably the chassis itself. To save combustible material (automobile) from burning; oxygen, heat and the chain reaction components must be dealt with. Oxygen can be replaced directly by spray of carbon dioxide. To monitor and detect fire in automobile system using various sensors such as Flame, Temperature and gas sensors. the gas sensor senses the gas smell and Fire sensor

senses the fire by giving hazard light stops the car and also opens the door automatically. The gas sensor senses the gas smell. The purpose of WP1 was to provide a description of available detection technologies, a summary of relevant standards and guidelines and an overview of up-to-date research in the field of fire detection in vehicles. The results of WP1 have been published in SP Report 2015:68 ―Fire detection & fire alarm systems in heavy duty vehicles: WP1 – Survey of fire detection in vehicles‖. The first part of that report gives a general understanding of how a fire can be detected, available technologies and how an alarm system may be structured. The main four fire signatures that are used for detection are gas, smoke, flames and heat. Gas detectors may be constructed to detect incipient gases or gases that are products of the combustion. Smoke detectors mainly react on the soot produced in case of incomplete combustion. Gas and smoke detectors may also be part of a sampling system, meaning that air is sampled and transported to the place where the detector/sensor is positioned. Flame detectors react on the radiation from the flames and may be sensitive to infrared or ultraviolet radiation, or both. At last, heat detectors are sensitive to the heat generated in the combustion process. The most comprehensive part of the report summarizes the standards and guidelines that are most relevant for fire detection in vehicles. No international standard for fire detection in road- or off-road vehicles exists, which was the original rationale for this project. Instead of fire detection standards applicable for other areas were examined. There are general approval standards for fire detection, for example EN 54. These are comprehensive and useful standards, however mainly applicable for buildings. In EN 54 it is explicitly stated that it is only valid for detectors used in buildings, but can be used as a guideline for other applications. This overview is very short due to the fact that not much has been published regarding this application

III. METHODOLOGY

3.1. Light/Gas/heat Sensor A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Based on this voltage value the type and concentration of the gas can be estimated.

3.2. Relay: The basics for all the relays are the same. Take a look at a 4 – pin relay shown below. There are two colors shown. The green color represents the control circuit and the red color represents the load circuit. A small control coil is connected onto the control circuit. A switch is connected to the load. This switch is controlled by the coil in the control circuit. Now let us take the different steps that occur in a relay.

3.3. Wiper motor permanent-magnet type: The electric wiper motor is a permanent magnet, rotary electric motor. A worm gear machined on the armature shaft drives the output shaft and gear through an idler gear and shaft. The output shaft operates the output arm, which is connected to the wiper linkage. As the electric motor revolves the output arm, the linkage is forced to move in a back and forth motion. The speed of the electric motor is controlled by resistors, located on or in the control switch, and connected to the wiper motor electrical windings. The control switch directs the current through certain circuits of the wiper motor, as the driver desires.

3.4. Welding: Arc welding is one of several fusion processes for joining metals. By applying intense heat, metal at the joint between two parts is melted and caused to intermix - directly, or more commonly, with an intermediate molten filler metal. Upon cooling and solidification, a metallurgical bond is created. Since the joining is an intermixture of metals, the final element potentially has the same strength properties as the metal of the parts. This is in sharp contrast to non-fusion processes of joining

3.5. Transformer: The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision

rectifier, which is constructed with the help of op–amp. The advantages of using precision rectifier are it will give peak voltage output as DC; rest of the circuits will give only RMS output.

3.6. Chain mechanism:A chain is made up of a series of links with the links held together with steel pins. This arrange makes a chain a strong, long lasting way of transmitting rotary motion from one gear wheel to another.

3.7. Wheels: The wheels used in pipe inspection robot is of 75 mm diameter and 25 mm width. This wheels made of nylon material. here we have used 6 number of wheels. The circumference of wheel a provided with rubber grip so that it should not sleep inside pipe. Three wheels are idle and other three wheels are powered by using DC gear motor. This wheels are used to grip pull and push the robot inside pipe.

3.8.Power supply: ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

3.9. Solenoid valve: solenoid A solenoid valve uses electromagnetic force to operate. When an electric current goes through the solenoid coil, a magnetic field is generated determining the movement of a ferrous metal rod. This is the basic operating process of a solenoid valve.

3.10. Rectifier: A rectifier is an electronic device that converts an alternating current into a direct current by using one or more P-N junction diodes. A diode behaves as a one-way valve that allows current to flow in a single direction. This process is known as rectification.

3.11. Pneumatic Systems: Cylinder is the actuator in the pneumatic system. When compressed air flows

Into a cylinder, energy stored in the air will release, transferring into kinetic.

IV. MODELING AND ANALYSIS

WestartedoutbycreatingabasicdesigninWORD.There is a system to give power (220V) to transformer and transformer convert power AC to DC in 5amp to Run the wiper motor, then motor get transmit power to rotate the Wheelsthrough the gear chain mechanism.Another one Transformer converts also AC volt to DC in 1amp and its used to operate the circuit rectifier to ac to dc conversion.There is used component like diode & capacitor which helps to convert dc current.Dc supply converted to relay operate through using motor can direct operate.After operatingrelayit sense to give sense to circuit to transmitter receiver led.Then relay gives command to solenoid valve to give 230volt supply given.Then door automatically opened for consumer safety.

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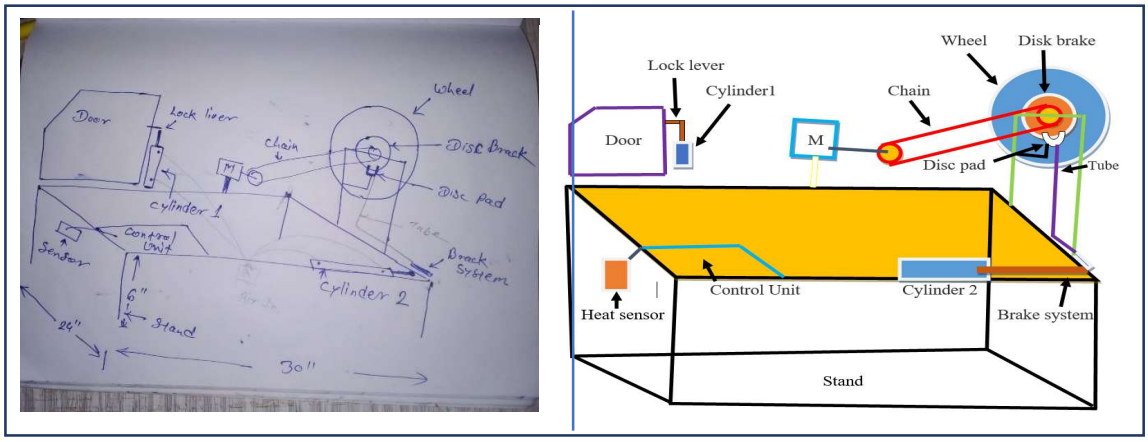

Fig.1. Fire Detection, Control and Automatic Door Unlocking System for Automobiles

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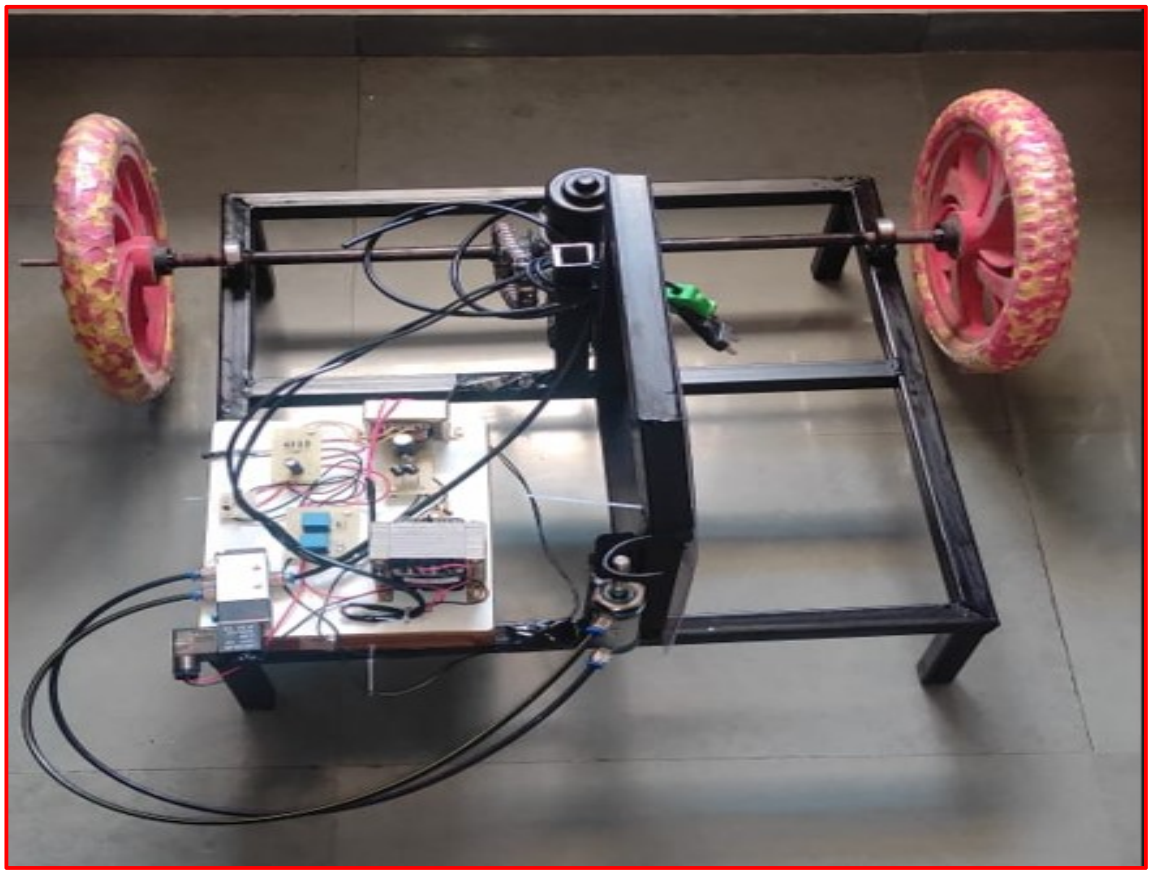

Fig.2. Fire Detection, Control and Automatic Door Unlocking System for Automobile

V. RESULTS

Protection of life, protection of property and continuity of operation.The purpose of an Emergency Plan is to ensure that the people in your premises know what to do if there is a fire and that the premises can be safely evacuated.The basic purpose of an automatic door unlocking system is to detect a fire in its early stages, notify the building occupants that there is a fire emergency and report the emergency to first responders.System is designed to open the doors in auto mode to an emergency so that we can take action to protect ourselves.

VI. CONCLUSION

The proper guidance of project head and the sincere efforts of our group have lead to the successfully accomplishment of our concerned projects. Pipe inspection robot System was interesting to work on and was also gained in this project work... This knowledge of project will definitely be helpful in our future. So we must maintain that this final year project was an essential part of our engineering education enhancing chemical knowledge and practical skill. Our aim was to Project aims to create for fire safety of human At current scenario, the above-mentioned system could be one of best fire emergency door unlocking system. It can be noticed from research papers that, there is no any mechanisms available so far to unlock the door during an automobile fire situation. A car safety system is planned here; it will facilitate to supply safety for car users furthermore as people. In the car, the gas sensor senses the gas smell and Fire sensor senses the fire by giving hazard light stops the car and also opens the door automatically. The gas sensor senses the

gas smell. This is the age of automation where human efforts are reducing to a great extent. Making lives simpler and smarter.

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