Lane control mechanism for automobiles

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ABSTRACT

Steering is the collection of components, linkages etc which allow a vessel (ship, boat) or vehicle (car, motorcycle, and bicycle) to follow the desired course. The basic aim of steering is to ensure that the wheels are pointing in the desired directions. This is generally achieved by a series of linkages, rods, pivots and gears. Many modern cars use rack and pinion steering mechanism, where the steering wheel turns the pinion gear; the pinion moves the rack, which is linear gear that meshes with the pinion, converting circular motion into linear motion along the transverse axis of the car. Lane control mechanism can be used in heavy-duty trucks and buses. With this mechanism Heavy trucks and buses can be steered if driver loose driving attention and vehicle cross off driving marked lane. The use of this intelligent steering mechanism will enable the generation of steering input independently from the driver. For example, HCVs can also be equipped with an active lane-keeping assistant to avoid serious accidents. The technology is variable, independent of front axle load, and environmentally friendly.

Keywords*: lane control mechanism, heavy duty trucks*

1. INTRODUCTION

The principle behind the working of our project lane control mechanism with active steering is that a counter steering effect and an alert to the driver can be issued if the marking on the road can be detected by the use of a suitable sensor. In our case, an infrared sensor is used to detect the road stripes on the road. These sensors are placed just below the vehicle body near the front two wheels. These sensors continuously monitors the road below them and in case vehicle came close to road stripes and exceeds it the sensor of that side sends a signal regarding this to the controller circuit. This circuit on analyzing from which side's sensor sends the signal calculates the motion to be given to the DC gear motor, which is connected to the wheel's steering mechanism with the help of some linkages and joints, so that the vehicle can be brought back to its own lane. Lane control mechanism is provided in optional mode that is if the driver does not want its vehicles to be directed by an electronic system or if some error occurs in the components of the circuit, this system can be turned OFF.

2. METHODOLOGY

The heart of the Lane Control Mechanism is the sensor integrated into the centermost part of the car for more convenience. This sensor senses the road's lane. A switch is provided near the steering to control the sensor. When switch is switched-on, sensor provided in the car works automatically. A vibrator is also integrated into the car so that when the car changes its lane without driver's attention, the vibrator starts making the steering vibrate and let the driver know of the car's present condition while giving the car a slight inward-lane direction and keeps the car on the same lane.

Construction of Project main frame

Construction of the frame can be completed by following the following procedure which is given in step by step way in this section:

- **Step-1** connect one slow speed DC gear motor with third metal gear electromagnetic clutches of lane keeping control mode.

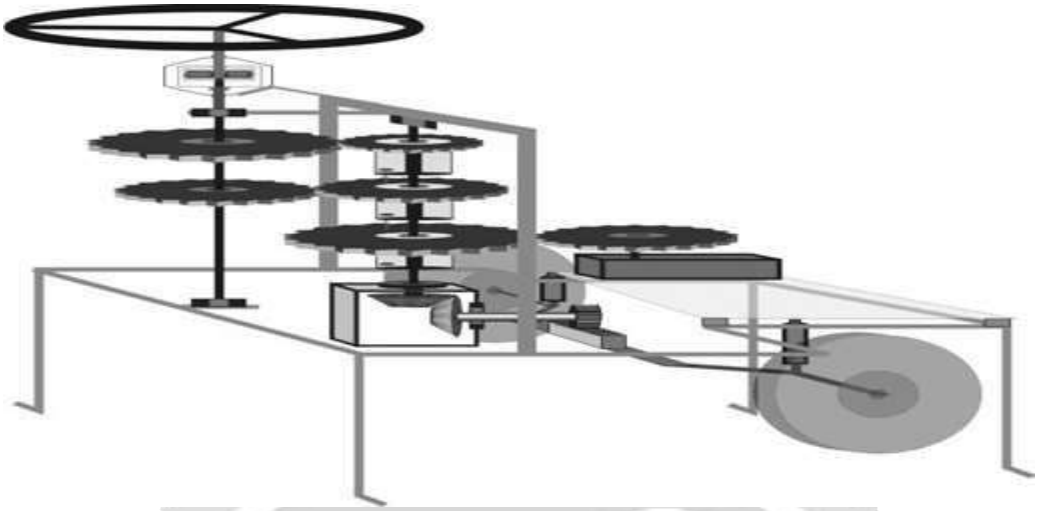

Fig 1. *Installation of DC Gear Motor with Electromagnetic clutch*

- **Step-2** Now construct two metal pole and insert one plastic pipe roller in it, this roller is painted black and Corner are wrapped with white tape to be made as road.

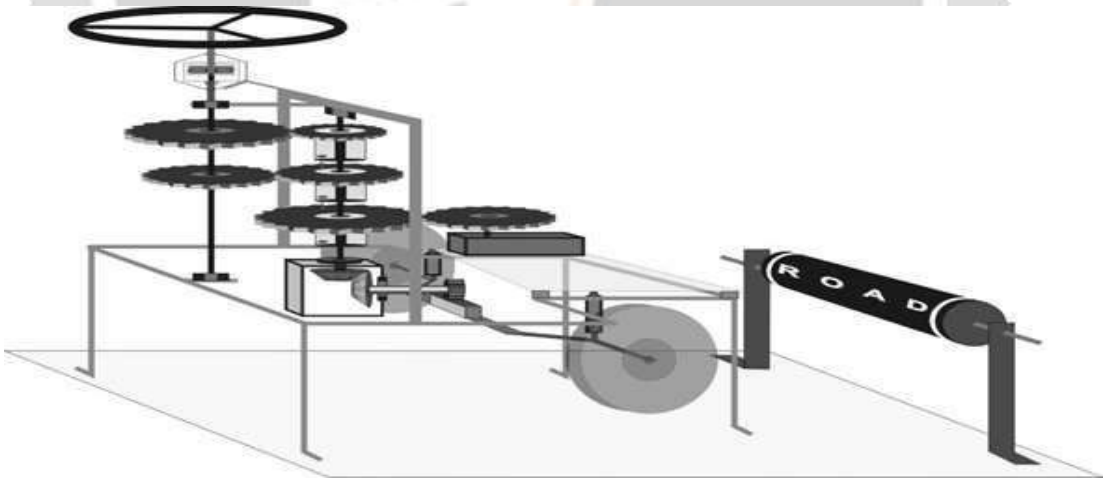

Fig 2. *Construction of metal pole for making road like conditions*

- **Step-3** Now we construct simple inferred control unit. This inferred unit check roller's(road) both white line, if side of lane is interrupted controlling switch on the gear motor to turn steering that side with alert buzzer. This mode will work if lane keeping mode is on.

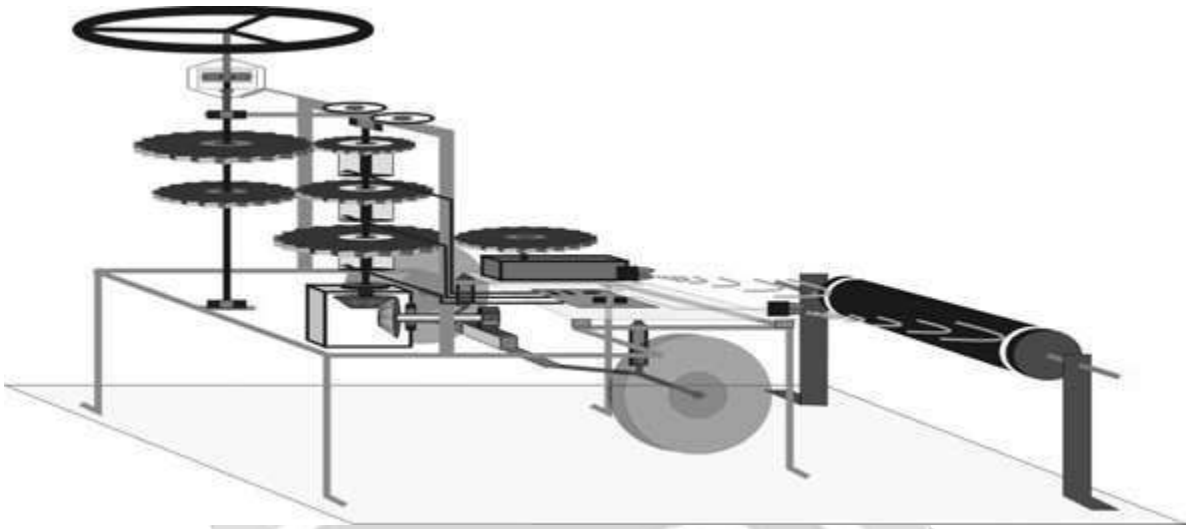

Fig 3. *Construction of infrared control unit*

3. CONCLUSION

Over the course of the project, we designed, built, and tested a Lane keep mechanism with active steering that is capable of alerting driver of the vehicle if its vehicle leaves its lane and bring it back without any input from driver it is also capable of providing a proactive assistance on every bent to make driving more comfortable. While doing this project, we learned about steering, electromagnetic clutches, DC gear motors, infrared sensor, IC LM567 & other electronic and mechanical components and how to connect them. Also, we learned the skills of planning, procurement which is vital to ensure that a project is completed within time and there is time left to improve the design or to troubleshoot as is normally needed. Throughout the project, we struggled with a lot of problems that includes making electrical circuits, assembling various components and last but not the least documentation of the project. But ultimately, we solved all the problems and our project worked much better than we expected. It was able to detect the road marks and buzzer was turned on timely and was able to bring vehicle back to its lane.In the future, sensor capability can be increased so that it can detect lane marking even in the worst condition of driving or otherwise can be made to work without being dependent on the lane marking and can detect if that the driver has lost attention on driving and take the control over vehicle and meanwhile alert the driver to pay attention on driving.

4. REFERENCE

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