

DESIGN AND ANALYSIS OF COMBINED ACCELERATOR AND CLUTCH PEDAL IN ACCELERATOR PEDAL

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I. ABSTRACT: This design modification is implemented in manual transmission automobiles to reduce the use of human power because of its potential applications as manipulating and managing two pedals (new pedal, brake) is easier than manipulating and managing three pedals (accelerator, brake, clutch). This system can eliminate the clutch pedal and by modifying the accelerator pedal (new pedal) we can make the clutch to engage and disengage itself according to the new pedal. This system has many advantages like it's very easy to operate, to avoid accidents which are due to application of wrong pedals in panic situations and increases the mileage in light traffic conditions. While changing gears and stopping the vehicle we need to release the accelerator and press the clutch. So, the report puts forward a kind of operation that can activate the clutch first and then the action of accelerator in a single pedal. The main objective of this project is to attach that system to an automobile so that the driver can control with 2 pedals. The action of the clutch is reversed with the spring. If we press the new pedal, at first the clutch is activated and after that the accelerator is activated and if we release the new pedal then at first the accelerator releases and then the clutch disengages simultaneously.

II. KEYWORDS:

Accelerator pedal and cable, clutch pedal and cable, new pedal.

III. INTRODUCTION:

A. Clutch Mechanism:

Clutch is a mechanical device which works on the principle of friction and is used in the transmission system of a vehicle to engage and disengage the transmission system from the engine. Thus, the clutch is located between the engine and transmission system. When the clutch is engaged, power flows from the engine to the driving wheels through the transmission system and then vehicle moves. When the clutch is disengaged, power is not transmitted to the driving wheels and the vehicle stops, while the engine is still running. The pressure on the clutch

pedal will make to detach from engine and if we release the clutch pedal it attaches to the engine. As the clutch is to be disengaged or partially engaged while the vehicle moves from rest, changing the gears and slowing down the speed. So, at the remaining time we need the clutch to be continuously attached to the engine continuously.

B. Accelerator Mechanism:

Accelerator is a mechanism by which the fluid (petrol, diesel, or alternative fuels) flow is managed in the automobile. The engines power can be increased or decreased by controlling the accelerator pedal.

C. New pedal:

This is the innovation that combines the operation of both the accelerator and the clutch pedals in the accelerator pedal (new pedal) to eliminate the clutch pedal. The new pedal will be divided into two halves. The first half will be function of the clutch and the second half will be the function of the accelerator. The pressure on the new pedal will make the clutch to engage till the first half and then next the accelerator will starts engaging from the second half till last. If we release the pressure on the new pedal then will be equal to double action (pressing the clutch and releasing the accelerator pedal) as in the conventional manual transmission vehicles. By this we can completely eliminate the clutch pedal but we can make the clutch to work itself according to the new pedal. So, we can make the control of vehicle in 2 pedals i.e., (brake and new pedal) instead of three pedals i.e., (accelerator, brake and clutch) as it is easier to take care of the 2 pedals instead of 3 pedals. By this we can avoid the accidents that are due to sudden unintended actions i.e., wrong application of pedals in panic situations just by releasing the new pedal and then pressing the brake pedal instead of pressing the clutch and brake in conventional vehicles.

IV. EXISTING SYSTEM:

With the continuous improvement of the control of automobiles, the effort required to control the vehicle has

been reduced from the last decades. There are various types of transmission systems. Mainly Manual transmission system and Automatic transmission system.

A. Manual transmission system: In this type, there will be gear ratio and there is need to change the gears according to the speed. While changing gears and making the vehicle to move from rest, clutch is pressed to allow the engine to spin at one speed, and the transmission and wheels at another speed without jerks. But at the hill starts if brake is released the vehicle will roll back within the fraction of seconds without allowing the driver to accelerate. So, it is difficult for the drivers to manipulate the three pedals.

B. Automatic transmission systems: In this type, they have the much more complex series of interconnected planetary gearsets. Each gear set is comprised of sun, planet and ring gears, and any of these smaller gears can be held still, spun by the engine or left to rotate freely. The transmissions gear ratios are produced by altering the parts in each gearsets that are fixed, powered or free to spin. The elements of each planetary system were manipulated via intricate chain of hydraulics and small clutches. By having a torque convertor, which permanently connects the engine and the transmission, automatics avoid having to disengage and re-engage a clutch whenever gears are changed or the car comes to rest. As the engine spins the driveshaft indirectly, a certain amount of power is lost. Although automatics are still heavier and more expensive to purchase or repair. So, with the new pedal the clutch pedal will be eliminated just by reversing the action of clutch and attaching it to the new pedal as it is easier to operate the vehicle.

V. PROPOSED SYSTEM:

The purpose of this system helps to overcome the problems that have been raised in the conventional transmission systems. As we use new pedal, we can eliminate the clutch pedal which will reduce the effort to the driver. The accidents that are caused due to the wrong pedal application in panic situations while stepped on wrong pedal can be avoided. And also, many drivers generally step on only on brake instead of pressing both the clutch and along with break to slow or to stop the vehicle. Because of this, gear efficiency can be reduced. The efficiency of the gears can be increased to little extent as the clutch will be detached from the engine if the new pedal is released. The mileage can also be increased to a little extent while we try to slow the vehicle just releasing the new pedal which will make the vehicle wheels to rotate freely to more distance when compared with the vehicle slowed down only with the break due to engine breaking.

VI. FLOW CHART

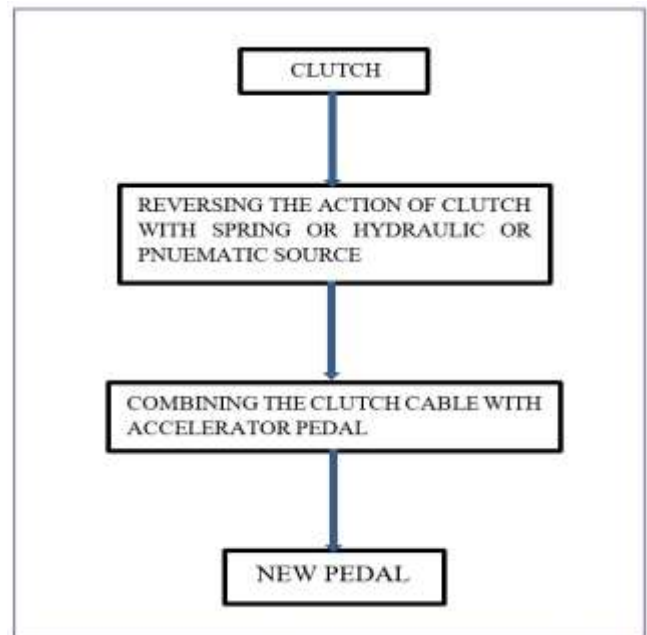


Fig-1: Flow chart of new pedal

The clutch will be generally engaged to the engine to transmit the power. Now, to make the new pedal we need to reverse the action of the clutch with help of spring, based on the strength that is needed to withhold the clutch cable in the detached position fully from the engine.

LOGICAL DIAGRAMS

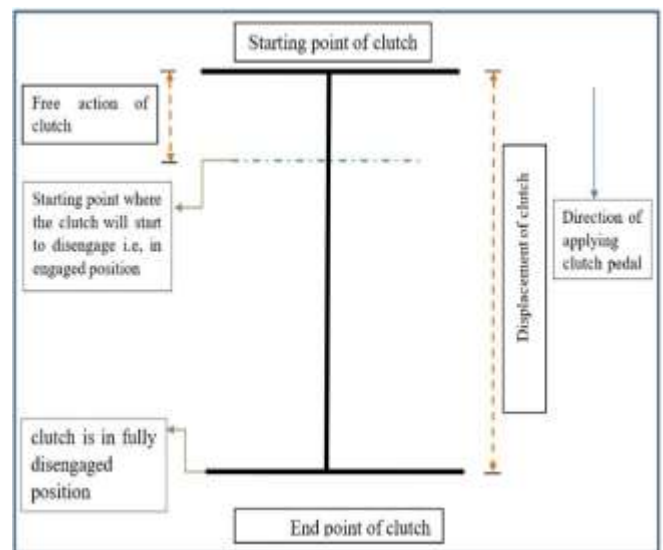


Fig-2: Logical diagram of clutch mechanism

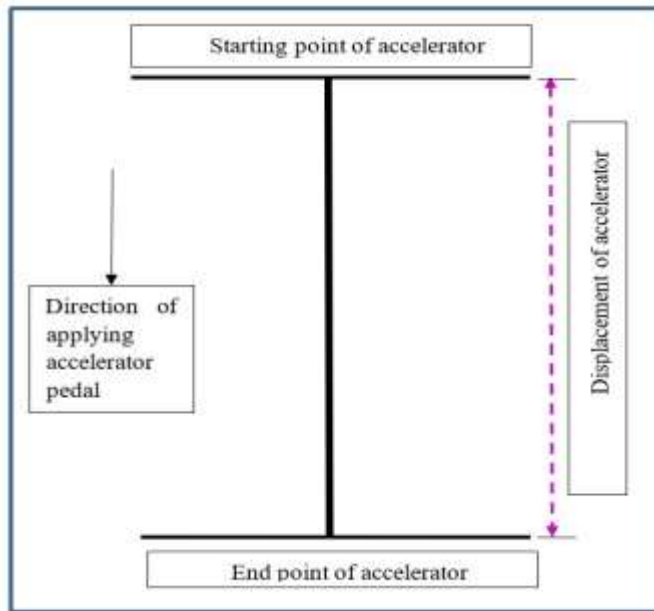


Fig-3: Logical diagram of Accelerator mechanism

VII. HARDWARE REQUIREMENT

A. SPRING:

A spring is a device that changes its shape in response to an external force, returning to its original shape when the force is removed. The energy expended in deforming the spring is stored in it and can be recovered when the spring returns to the original shape. Generally, the amount of the shape change is directly related to the amount of force exerted. If too large force is applied, however, the spring will permanently deform and never return to its original shape.



Fig-4: Spring

VIII. DESIGN OF PEDAL

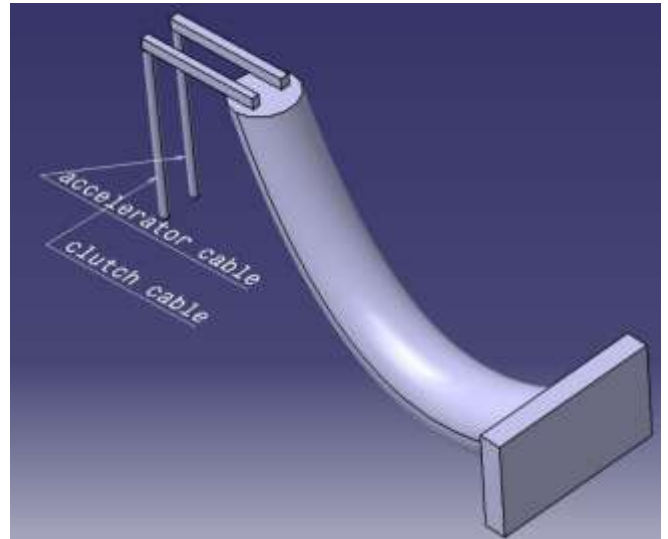


Fig-5: New pedal

IX. NEW PEDAL MECHANISM (fig-6):

Position (1) at 0% pressure on the new pedal- the clutch disc will be fully disengaged, the free displacement of accelerator cable.

Position (2) from 1% pressure on the new pedal -engage of the clutch disc will start, free displacement of accelerator cable.

Position (3) from 1% to 39% pressure on the new pedal- the clutch disc will be engaging, the free displacement of accelerator cable.

Position (5) at 40% pressure on the new pedal- the clutch disc will be engaging, and the acceleration will start.

Position (6) from 41% 59% pressure on the new pedal- the clutch disc will be engaging, and also the acceleration.

Position (7) at 60% pressure on the new pedal- the clutch disc will be fully engaged, and the acceleration will be working.

Position (8) from 61% to 99% pressure on the new pedal- the clutch disc will be fully engaged already from 60%, the acceleration will be working.

Position (9) at 100% pressure on the new pedal- the clutch disc will be fully engaged already from 60%, the acceleration ends.

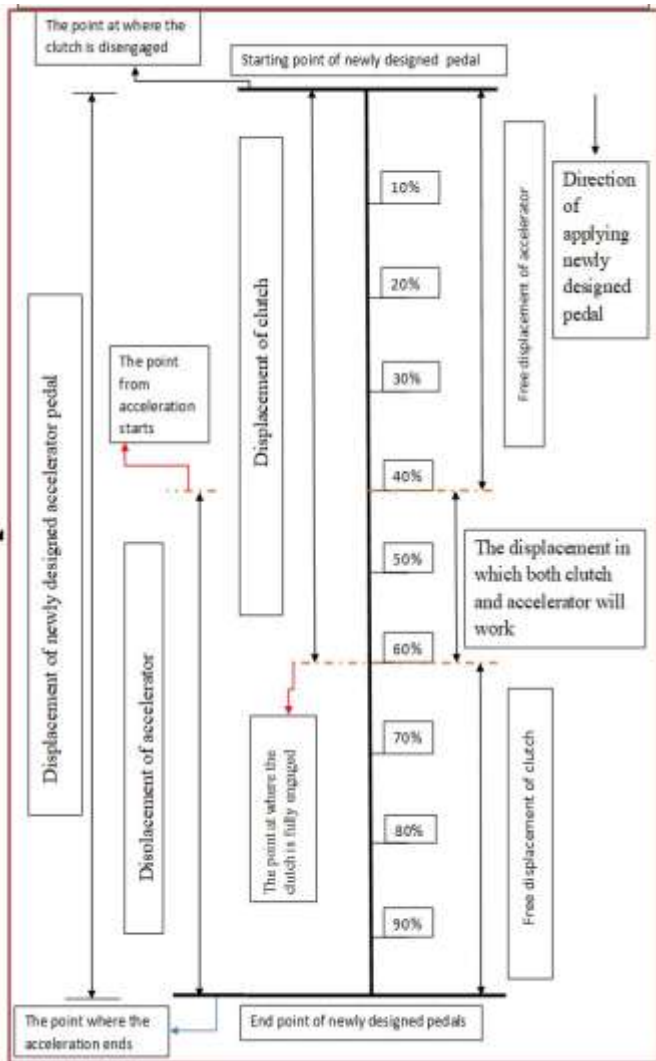


Fig-6: Logical diagram of New pedal

X. ADVANTAGE:

- Less cost when compared to automatic transmission vehicles.
- Less effort to the driver in traffic and hilly stations.
- Gear life can be increased.
- Fuel efficient when compared with manual and automatic transmission systems.
- Accidents due to wrong pedal application can be avoided.

XI.FUTURE SCOPE AND BENIFITS:

- By further research and modification this new design should be bought into the cars.

- We can reduce the accidents that are caused due to wrong application of pedals in panic situations.
- Gear life can be increased and also the mileage to a little extent.
- Driver can drive the vehicle with less effort in traffic and hill stations.

XII. CONCLUSION:

This project can eliminate the clutch which will decrease the effort to the driver pedal and if employed perfectly then the gear life and the fuel efficiency also increases.

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