

Proposed Design For Automobile Door Clearance Mechanism

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ABSTRACT

The automobile technology has its birth in the period of 19th century. There are tremendous changes in design of automobile except the doors. In the past decades the evolution of modern cars doors were changed but that was an altered of the old model. No aesthetics was invented in that part. The conventional door is less convenient for Indians during parking since the space for parking the vehicle is very congested and also to escape them in a critical situation when stuck in a heavy traffic becomes difficult. A new concept is designed mainly focused on this car system. The main aim of our idea is to avoid the accident without knowledge in opening and closing of car doors, also mainly face difficulties in opening of car doors during parking. Many of them can't get out from the car while in traffic during some emergencies, considering all this issues. We have created a new prototype door design to overcome such problem and design will be handy for all the present and future AUTOMOBILES.

INTRODUCTION

Automobile being outnumbering the humans, its being necessary to make it more sophisticate and ergonomic, more than that safety comes important to it. So many technologies and innovations are made to fulfil. Although some needs are need to meet



One such inconvenience is the door opening clearance; conventional doors of car may create lot of menace from parking troubles to even accidents. So comes our new mechanism; here we eliminate

parking troubles and accidents due to space or clearance of door opening.

DOOR CLEARANCE MECHANISM

This is the mechanism where the door slides below the chassis instead extending horizontally outwards. So door opening need no more clearance outward, easy to park and open. No more accidents due to carelessness

CONVENTIONAL DOORS

A conventional door also known as regular door is a type of door that is hinged at the front facing edge of door and so allows the door to swing outward from the body of the car. These door are relatively safe, in that if they are opened during forward motion of the vehicle, the wind resistance will work against the opening door, and will affectively force its closure.

TYPES OF DOORS

SUICIDE DOORS

Suicide doors are a type of door that is hinged on its trailing edge. The term "suicide door" was coined due to the potential for the door to fly open for the latch is released during forward motion of the vehicle

SCISSOR DOORS

Scissor doors are doors that rotates vertically upward, and are hinged at or near the end of the windshield

GULL-WING DOORS

Gull-wing doors are a type of door that is hinged on their upper most edge, at the roof rather than the side. They are so named because, when opened, the door evokes the image of a seagull opening its wing.

SLIDING DOORS

Sliding door are a type of door that open by sliding horizontally (or) vertically, where by the door is either mounded on, or suspended from a track. They are often used on the slide of commercial vans, as this allows a large opening for equipment to be loaded and unloaded without obstructing access.

CANOPY DOORS

A Canopy door is a type of door that sits on top of a car and lifts up in some way, to provide access for passengers. It is similar to an aircraft canopy. There are no set standards to canopies, so they can be hinged at the front, side or back-although hinging at the front is most common. Used mostly in vans.

DISADVANTAGES OF CONVENTIONAL DOORS

- The door still impedes access/egress much more than a gull wing and, in some cases, more than a conventional door.
- The manufacture cost of the door hinge can be more than that of a conventional door.
- If the height of the parking lot ceiling is insufficient, the door may come into contact with it when opened.
- In the event of a rollover, emergency egress may be more difficult than with conventional doors, if not impossible.
- Safety hazards include a passenger falling from the vehicle being hit by the door, passengers being injured by a passing car colliding with open doors and trapping them between the door and car body,
- Aerodynamic factors forcing rear-hinged doors open at speed.



FIG: rail with roller bearing

PROPOSED DESIGN FOR AUTOMOBILE DOOR CLEARANCE MECHANISM

This is very simple mechanism, easy to fabricate,

- Door slides with the roller along the guide way in the vertical axis.
- And it goes down below chassis
- It slides down with the gravity
- It moves freely down
- And restricted by just a mechanical stopper
- Occupies the ground clearance which the Indian cars have got more

COMPONENTS USED

RAIL

Rail is assembled into the chassis. It is installed by the screws, so it is easy for installation. Shape is adapted to the chassis

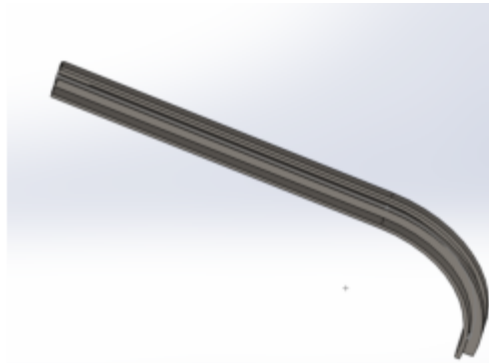


FIG: rails

ROLLER BEARING

The main reason to select roller bearing is the direction of loads they support; these can be axial and radial. Depending on where the bearing is being used, it may see all radial loading, all thrust loading or a combination of both.

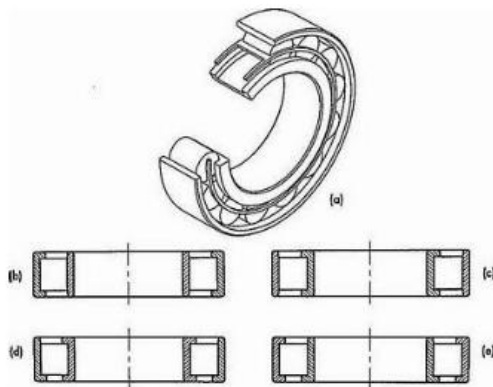


FIG: Roller bearing

LOAD APPLIED

When the size of the door is assumed to be 1000mm wide x 2000mm high, with the kerb weight of 40lbs.

The differential Pressure is 60 Pascal

The handle is 70mm away from the leading edge of the door.

$$A = 2 \text{ m}^2$$

$$\text{Force} = A (\Delta p)$$

$$\text{Force} = 2 \times 60$$

$$\text{Force} = 120 \text{ Pa}$$

If 10 Pascal's is equivalent of 1Kg of force /M2

- Force = 12Kg (to lift the door)

ADVANTAGES

Despite the common misconception that this door is mere stylistic affectations, the design is a very practical one in a tight urban parking space. When properly designed and counterbalanced, they require little side-clearance to open about 2.9 cm, or 1.1" and allow much better entrance/egress than conventional doors.

CONCLUSION

Thus the proposed mechanism satisfies the solution distinctly, without affecting the aerodynamic properties, aesthetic look, not making more expensive than conventional doors. These kind ideas should be welcomed by concern community and made commercial as soon as possible.

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