Portable Carrier for Handle Locked Two Wheelers

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Abstract—*Two wheelers are the most economical way of transport in India. Owning to this, there has been an increase in the number of two wheelers especially on Indian roads which has led to increasing number of accidents and casualty. The aim of this project is to design & develop a new mechanical system for automobiles, especially for two wheelers whose handles are locked and but than also they should be carried from one place to another for various purposes like if the two-wheeler is handled locked and it's parked in No Parking zone than the traffic police need tremendous human & muscle efforts to drag that vehicle from no parking area to attach it to toeing vehicle after that it is carried to nearest traffic police station. Our project aims to provide hassle-free driving experience to the driver or to a traffic personnel or in an automobile manufacturing industry and remove the discomfort hence resulting in safety.*

Keywords— Portable Carrier, plate, lever, brackets, dimensions, model.

1.INTRODUCTION

In metro cities like Delhi, Mumbai, Pune etc. where two-wheeler handles are locked in no parking area or in an automobile manufacturing industry and yet they need to be moved even when they are locked because of various reasons or in some area's corporation crane cannot be used as some of the roads are very narrow and it is very difficult for people to manually lift it as it requires muscular stress for person lifting the vehicle and there are high chances of vehicle getting damage. In such conditions portable carrier for handle locked two wheelers is used.

This mechanical system or device also helps to reduce the damage to the vehicles or completely removes the probability of damage to the vehicles.

2.OBJECTIVES

Developing a mechanical arrangement that can align the handle locked wheel in such a way that one can simply drag the vehicle just in the way an unlocked vehicle as it is :-

- Easily transportation of Two-wheeled vehicle from no parking area to a toeing vehicle
- Causes no damage to the vehicle
- Lower Human Efforts
- Reduce Human Pain

3. MODEL

The arrangement should be portable and easy for them to carry a vehicles weight and easy enough for a person to pull it with bare hands

Thus, we came up with this, Let's have a look at the product in detail:

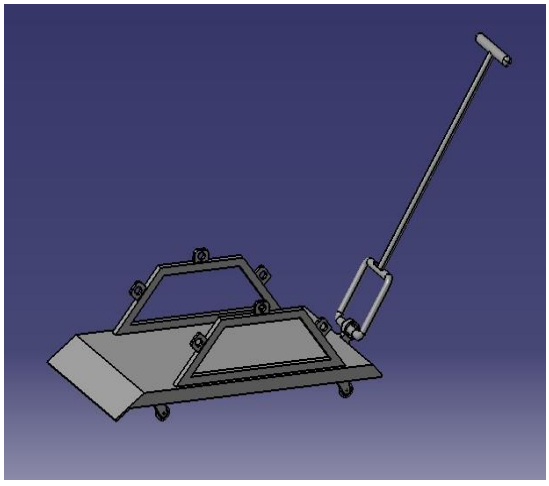


Fig-1: Model

4. COMPONENTS OF MODEL

A. Plate:

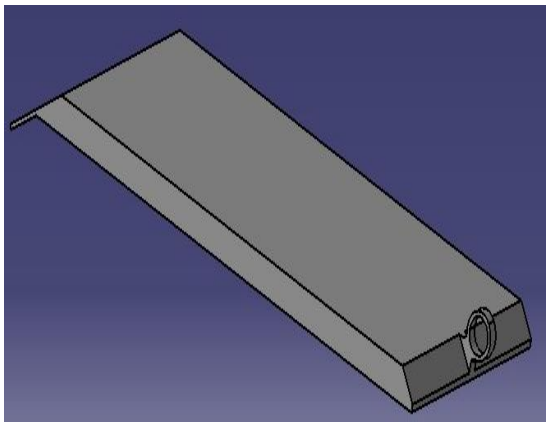


Fig. 2: Plate

B. Lever:

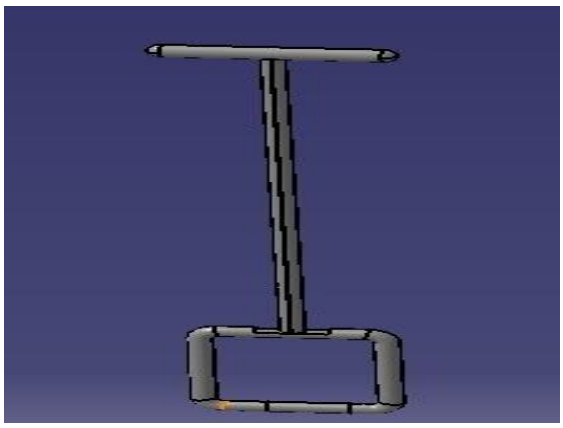


Fig. 3: Lever

C. Brackets:

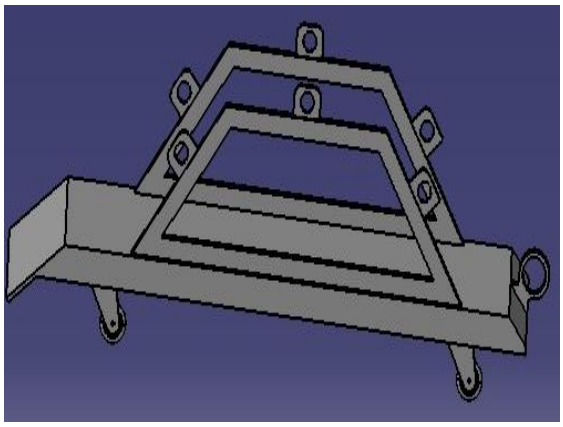


Fig. 4: Model

D. Wheels:

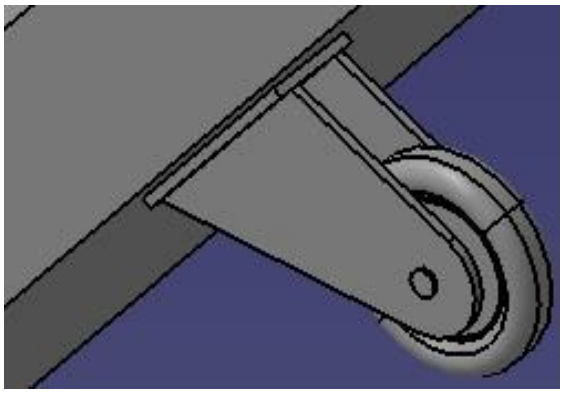


Fig. 5: Wheels

E. Hooks:

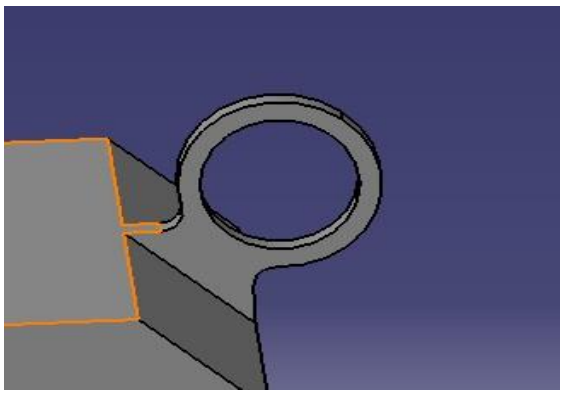


Fig. 6: Hooks

5. DIMENSIONS

A. Plate Dimensions:

Length of the rectangular plate = 700 mm

Width = 450 mm

Thickness = 5mm

The front of the plate is 100mm & is given an inclination of 35 degrees

Now lets us consider the bending strength of the plate. The safe tension or

compression stress is bending of mild steel is 155-165 N/mm2.

Length(l)= 700 mm

Width (w)= 450 mm

Thickness (t)= 33 mm

Weight (W)=160 kg = 1568 N

Bending Stress (M/Z)=(W x w) /(lt^3/12)

Bending stress = (1568 x 450)/(700*33 ^3/12)

Bending stress = (1568 x 450)/([700*33 ^3]/12)

Bending stress = 96.76 N/mm2 = 97 N/mm2

B. Lever Dimensions:

Waist height is taken between 90cm to 120cm and

the pulling force is 40lb ; length of the lever is 90cm

Now to find the force W2 acting on the lever, we consider right angled triangle by taking one side as 784 N and the hypotenuse as W2 which is to be found. The angle is

taken as 30 degrees by considering human ergonomic principle. So according to the right-angled theorem,

Cos30= /W2

W2= 1568 /cos30

W2=1810.1 N

Hence the downward force acting on the lever is the plate parallel to lever is a component of the main force of the front wheel of the vehicle acting in the downward direction on the plate. The lever has a tensile force of 905.31 N in downward direction.

The safe tensile stress for lever is 80N/mm2

The lever is subjected to the direct tensile stress,

Pulling force (W1) = 180N

Downward force (W2) = 1810.1N

Tensile Stress = W/A

Tensile Stress = w2-w1/A

Tensile Stress = (1810-180)/ (314)

Thus, the tensile stress is safe since it turns out to be 16.3

C. Brackets:

The main purpose of the bracket is to prevent the vehicle front wheel motion. They are made of square shaped hollow pipes.

Hollow pipes are used to reduce the carrier overall weight without compromising its strength.

D. Hook/Joints:

A lifting hook is the device that is used for grabbing and lifting loads by means of device such as a hoist or crane.

Here a lifting hook is used to connect the pulling lever to the plate. The lifting hook can be equipped with a safety latch to prevent the disengagement of the lever.

E. Wheels:

In total 4 wheels are used, out of which two are fixed wheels and the remaining two are rotating wheels.

The front wheels are kept rotating and rear wheels are kept fixed so that the carrier with less efforts can be pulled in any direction.

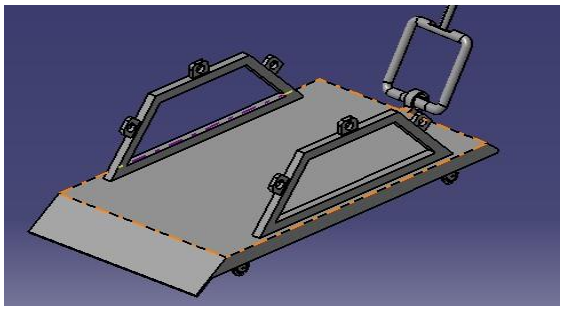
Another type of wheels called spherical wheels can be used. Here locking wheels can be also be used which has a lock that stops the wheel and prevents it from rolling.

6. WORKING PROCEDURE

A. Working of Brackets:

i] 1st Case

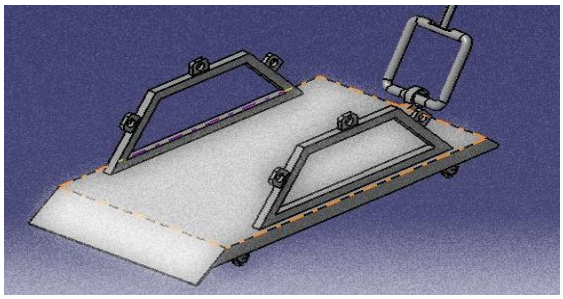
If a motorcycle is to be carried, one rod is placed behind the wheel between the brackets and the other rod can be inserted between the spokes of the front wheel between the brackets, so that the wheel will be properly locked.



ii] 2nd Case

If it is moped, it has disc which allows no rod to pass through it, in this case two rods are used, one at front between the brackets 1-1'

Another behind the wheel between the bracket 3-3' so that the front wheel is locked properly.



B. Working procedure to pick up two wheelers -

i] Step 1 :

Firstly, we have to put vehicle on main stand. The vehicle must be pulled outwards so that there is sufficient place available where the carrier can easily be placed in front of it and further the vehicle can be pulled to the toeing truck easily.

ii] Step 2 :

After this simply place the carrier in front of the vehicle in an angle such that the vehicle is removed from the main stand, the front locked wheel of the vehicle easily comes on the plate. Take care that the vehicle does not slide away while loading the vehicle. For this the rod can be put vertically in the fixture such that we get two-point contact brakes. The carrier can also be stopped manually from moving.

iii] Step 3 :

If you give a small force in downward direction on the back seat of vehicle rises by a small height. This height can be utilised and ramp stand manually. The front locked wheel of the vehicle easily goes in the middle portion of plate between the fixtures.

iv] Step 4 :

Now once the vehicle comes in between the fixture in the middle of the plate, its rolling direction of the front wheel is restricted sideways due to the fixture. In fixture there are brackets provided which can accommodate the rod. The backward rolling motion of the front wheel is restricted due to the rod in the bracket as shown here

v] Step 5 :

The front motion of the vehicle wheel is restricted by fitting another rod in front brackets. If the vehicle is moped, the rod can be fitted in the last two brackets as shown here, where the wheel will properly get locked between the rod. If the vehicle is geared vehicle, then front wheel diameter is bigger so the rod can be fitted.

vi] Step 6 :

Once the wheel is properly fitted on the carrier plate and its all motions are locked, now the vehicle is locked on the carrier. Here only two people will be required, one to hold the vehicle at the back and other pulling the carrier.

7. APPLICATIONS AND FUTURE SCOPE

1. In case the front tire is punctured the plate can be used to accommodate the same and then fix it. It can hold the punctured tire well. This may then also not need the castor wheels.
2. The main function of the portable carrier is to lift the two-wheeler from the no parking areas without causing any damage to the vehicle. This is the basic application but it can also be implemented in other applications such as
3. In case of parking areas of malls, sometimes we are asked not to handle lock the vehicle so that it becomes easy to move the vehicle in order to remove the proceeding vehicle from the parking area. Here the carrier can be used so that the vehicles security is maintained.
4. If the portable carrier can also be made foldable such that we can easily carry or hang it to the vehicle, then it can be also be used to drag the punctured two wheelers.
5. This portable carrier can also be used in manufacturing industries of two wheelers to transport the new manufactured locked two-wheeler from one place to another.
6. Once the vehicles are lifted from the no parking areas, the carrier can also be used to unload the vehicles from the truck. Here to reduces the efforts of the labours and transports the two-wheeler easily and without causing any damage to the vehicle.

8. ACKNOWLEDGEMENT

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