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BICYCLE ROTOR

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Keywords:

- Design & manufacturing rotor part.
- Assembling the complete project.
- On field testing of working model.

ABSTRACT
Nowadays in agricultural sector, new techniques are invented to improve farming methods & outputs. For plantation of secondary crop where tractor operated rotor cannot be used due to insufficiency of space, a manually operated compact rotor is a need of the hour. While researching about project, we realized that, a compact model of can be rotated using a combination of gear & chain arrangement, thereby reducing equipment cost & improving work efficiency for secondary crop. This bicycle rotor is used in agriculture purpose, like to remove unwanted grass from farm, harrowing of soil.

INTRODUCTION
Now a day's Indian farmers are unhappy about spent money soil preparation because of raise in fuel price and rotavator blade replacement cost. So the farmer focused more in reducing the preparation of land cost and increases in yield. So we decide to design a bicycle cultivator which is very effective in cost so that the farmer can buy it. The bicycle cultivator is used to lose the upper layer of soil and create seed bed or soil bed.

We are going to invented a new technique for agriculture purpose that bicycle rotor work on the rotary motion of the front wheel, is directly coupled with rotor by using gear and chain arrangement. In this system we are going to decreases the cost of equipment/model that working in our farm and also produces an effective work like removing unwanted grass from farm and friable of soil.

MATERIALS AND METHODS

Table 1 Material & methods.

Sr. No.	Material	Specification	Quantity
1	Kolape	Buy	1
2	Gear	Big gear 48 teeth Small gear 16 teeth	2 2
3	Chain	2 feet long	2
4	Shaft	1.6cm thick 30cm long	1
5	Rotor blades	Steel ss210 13 ×2.5cm Cutting edge angle 45^0	24

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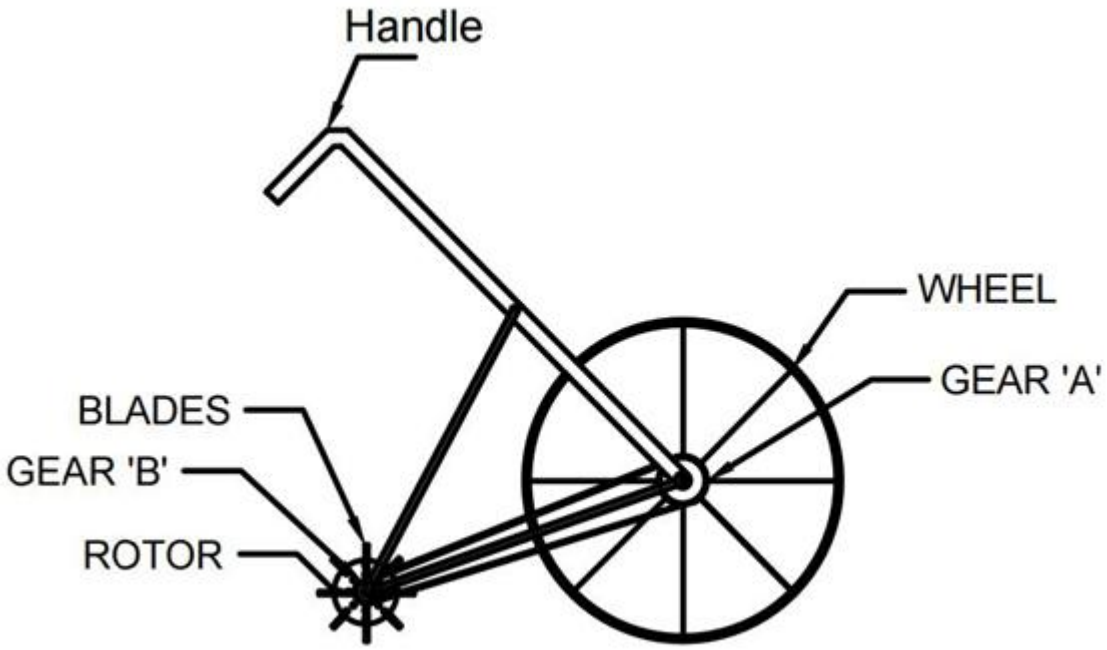
Figure



DESIGN OF ROTOR SHAFT (SOLID SHAFT)

1. Equivalent torque (Te)

i) Shaft subjected to torque, bending movement & axel force.

$Te = \sqrt{(((KbM) + (Fd/8))^2 + (KtT)^2)}$

ii) Shaft subjected to torque and bending moment only $Te = \sqrt{((KbM)^2 + (KtT)^2)}$

iii) Shaft subjected to torque only

$Te = KtT$

2. Maximum shear stress induced in shaft (τ_{max})

$(\tau_{max}) = (16T_e)/ (\pi d^3)$

3. Allowance shear stress

i) According to maximum shear stress theory. $(\tau all) = (Ssy/N) = (0.5 Syt) / N$

ii) According to ASME code.

(τall) = (0.3Ssy or 0.18 Sut) without key way

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4. Torsional Rigidity

i) Torsional stiffness (KTS)

$$Kts = GJ/L$$

ii) Torsional deflection (θ) in rad

$$\theta = (TL) / (GL)$$

iii) Torsional deflection (θ) in deg per meter length.

$$\theta \text{ (degree)} / L = (180T) / (GJ)$$

iv) Polar moment of inertia (J)

$$J = (\pi d^4) / (32)$$

5. Weight & Strength of solid shaft is more.

WELDING JOINTS (Thermit welding)

Thermite welding, a mixture of iron oxide & aluminum called Thermit is ignited & the iron oxide is reduced to molten iron. The molten iron is poured into a mould made around the joint and fuses with the part to be welded. A major advantage of Thermit welding is that all part of weld section are molten at that same time and the weld cools almost uniformly. This result in a minimum problem with residual stresses. It is fundamentally a melting and casting process. The thermite welding is often used in joining iron steel part that are too large to be manufactured in one piece. In steel thermite welding is employed to replace broken gear teeth, to weld new necks on rolls and pinion, and to repair broken shear.

RESULTS AND DISCUSSION

In this study, design of rotor will investigated and design modification will be done by introducing one more cutting edge in other side of the blade.

Soil restriction without structure failure and same time and blade life increases double time, by interchangeability concept of bicycle rotor and we observed that reducing farmer effort by analyzing.

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