

HALUCENT

Yash Patel¹, Prashant Maurya², Prince Rawat³, Rishabh Kanaskar⁴

¹ Bachelor of Engineering, Mechanical Engineering, Parul Institute Of Technology, Gujarat, India

² Bachelor of Engineering, Mechanical Engineering, Parul Institute Of Technology, Gujarat, India

³ Bachelor of Engineering, Mechanical Engineering, Parul Institute Of Technology, Gujarat, India

⁴ Bachelor of Engineering, Mechanical Engineering Parul Institute Of Technology, Gujarat, India

ABSTRACT

“HALUCENT” is a device that converts mechanical energy into electrical energy with the help of amplification devices and gears. This device is the solution for the millions of peoples who are not sufficiently wealthy to afford even light and are forced to use candles and lanterns. The device transmutes the energy of gravity into mechanical energy, then this mechanical energy is transfigured into electrical energy with the help of dynamo.

Keyword: - Halucent, Amplification Gears, Dynamo, Gear Reduction, Weights, LED

1. OVERVIEW and OBJECTIVE

Since the inception of civilization, people have desired light during night. For the majority of prehistoric and historic times, this has been provided by combustion of an appropriate fuel, originally we are using whatever combustible material, later using a combustible hydrocarbon fuel. Invention of light bulb by Thomas Edison was crucial and technology made great advancements in improving the types and efficiencies of light sources.

Alone in India more than 280 million people are forced to live without electricity due to unavailability of electricity or incapability of paying for electricity. Thus they are forced to use lanterns and candles to light their homes at night. Thousands of people in India suffer from lungs and breathing diseases due to inhaling toxic smokes of lanterns and candles.

Halucent is a device that converts mechanical energy into electrical energy with the help of amplification devices and gears. This device is the solution for the millions of peoples who are not sufficiently wealthy to afford even light and are forced to use candles and lanterns.

The device transmutes the energy of gravity into mechanical energy, then this mechanical energy is transfigured into electrical energy with the help of dynamo. It can resolve all the problems of light for poor peoples. The device has to be mounted at a head and at one end of device there will be weight that will slowly lower down due to the force of gravity thus turning the sequence of gears and hence produce useable DC electricity that can be stored or used as light. There is provision for charging USB devices. Halucent is meant to provide free electricity for light to the needy peoples and to substitute the fuel powered TOXIC lights.

2. LITREATURE REVIEW:-

2.1 DESIGN:

The Halucent is an LED lamp that works by harnessing the gravitational force exerted on a weight hanging from the lamp. One lift of a (12 kg) weight, (which is formed by filling the fabric bag the light is delivered in with rocks or sand), generates enough power to provide 30 minutes of light with no need for rechargeable batteries or fuel, which means no running costs.

The unit has also been designed so that it can be used to power other devices, such as a radio, or recharge batteries, which can be connected to terminals on the front of the unit. The brightness of the Halucent can also be adjusted based on the task at hand or to increase light running time.

The Gear train that is used for speed reduction of falling weight will be connected to a center shaft. The center shaft will be mounted with a circular disk with an eccentric fixture near the circumference of the disc. 4 300 rpm motor will placed at 90 degrees to each other with the help of plus shape base plate. This mechanical arrangement is analogous radial engine mechanism. It will optimize the generation of electricity in least movement for recoiling the motor spiral springs will be used. These dynamos will have a pulley loaded with string on its shaft, and this will be connected to the eccentric jig that will pull the string to rotate the dynamo.

2.2 WORKING

There is provided a gravity-driven electrical energy generator apparatus comprising a support frame, at least two high step-up ratio gears mounted in series in the support frame, wherein the power input to the most upstream gear is provided by a weight suspended from a point to one side of the axis of rotation of the gear, and wherein the power output from the most downstream gear is the shaft of a generator, the output of the generator being sufficient to power at least one high brightness LED. The apparatus is characterized in that the gear ratio of the internal high ratio gear is at least 25 and the contact between the drive gear and the generator shaft is frictional. Preferably there are two or three step-up gears and the gear ratio of each is greater than 25, preferably greater than 30. the apparatus of the present invention is particularly adapted for generating power to run one or a few high brightness LEDs for an extended period of time, eg. up to 30 or more minutes, it may also include means for reducing the step-up gear ratio of internal gear substantially, for example, from at least 25 to eg 2 to 5. While such reduction materially reduces the period of time taken for the Weight to fall through a given distance, it substantially increases the electrical power available for that period Which enables the apparatus to be used to recharge electrical devices Which are driven by stored charge, for example mobile telephone handsets, rechargeable torches. The charge internal gear ratio may be achieved by any suitable practical mechanism, for example mounting a toothed ring on internal drive gear of the high ratio step -up gear, mounting a cog on the generator input shaft rotationally there, and providing the cog for the temporary engagement of ring and cog to substitute the not so-high step-up gear ratio of internal step-up gear is 2 to 5. We have found that using a gear ratio of 2.5 in apparatus other Wise as described above, We can charge a mobile phone handset With two 1.8 m drops of the 10 kg Weight taking just over six minutes, sufficiently to provide three minutes of talk time or three hours in standby mode. Preferably the diameter of the drive shaft of the generator is as small as possible to give the greatest internal gear ratio possible. It is preferable to mount, adjacent the shaft and opposed to the gear Which drives it, one or two 'pinch' Wheel (s) Which assist in maintaining the frictional contact, to reduce any tendency to slipping, While also reducing the lateral force on the input shaft of the generator. The drive shaft to the generator may be a simple constant diameter shaft, but it is also possible to make the shaft tapered, so that by moving the generator in the direction of the axis of the drive shaft gear ratio between the drive shaft and the disc driving it frictionally changes. Such movement of the generator may be achieved by having a 'tuning' knob e.g. mounted on the outside of a housing of the apparatus so that the user can adjust the knob till the light output is brightest for a particular Weight.

2.3 THE PROBLEM STATEMENT

We need to design a gear box with minimum speed reduction of 1:30 ,Another difficulty was that for getting maximum feasible speed reduction we used worm gears but worm gear had self-locking that was not favorable for recoiling the weights to its upper position.. In order to overcome these difficulties, we eliminated the use of worm gear and instead we used spur gears and devised a gearbox using compact compounding of gears. We chose spur gear over any other gear because they are very cheap and it will reduce the cost of our final product.

3. EXPERIMENTAL SETUP

3.1 MAIN COMPONENTS

1. Dynamo
2. Gear Train
3. Pulley
4. LED
5. Voltage Booster
6. Weights

7. Recoil spring

3.1.1 Dynamo

- 1000RPM 12V DC motors with Gearbox
- 3000RPM base motor
- 125 gm weight
- 1.2 kgcm torque
- No-load current = 60 mA(Max)
- Load current = 300 mA(Max) ,

The motor will be used as a generator , the input terminals are used as output terminals and hence the motor will produce electricity when the work is done on it.



Fig. 3.1 Dynamo

3.1.2 Gear Train

A gear train is a mechanical system formed by mounting gears on a frame so that the teeth of the gears engage. Gear teeth are designed to ensure the pitch circles of engaging gears roll on each other without slipping, providing a smooth transmission of rotation from one gear to the next. The gear train used is a compound gear train. The gears with minimum teeth is 10 and maximum teeth is 60, while intermediate gears has 35 and 18 gear teeth. We have used 4*60 teeth gears, 2*10 teeth gears,4*18 tooth gears and several intermediate gears.

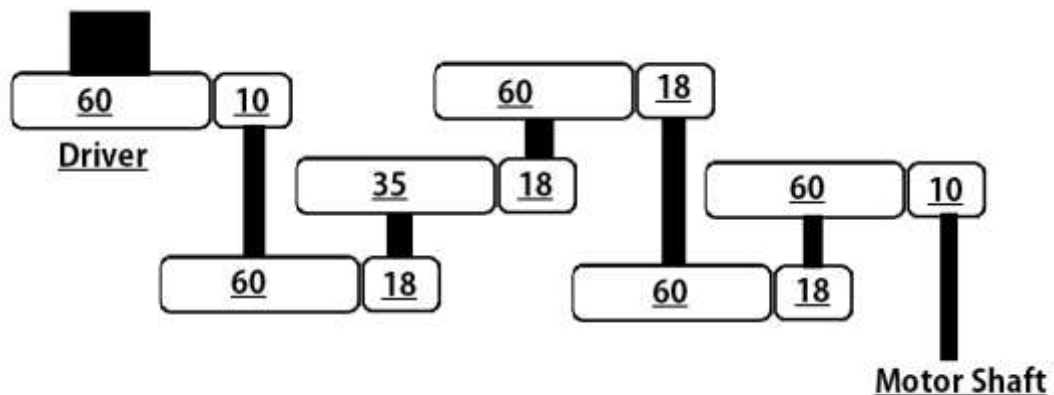


Fig. 3.2 Gear Train**3.1.3 Pulley**

A pulley is a wheel on an axle or shaft that is designed to support movement and change of direction of a cable or belt along its circumference. In Halucent the pulley will be connected at the end of the gear train. The pulley will act as the driving Source for the whole system. Weight of 10 kg will be mounted on the pulley which will rotate the pulley thus generating enough rotation to produce electricity for light. The pulley will have projections know as teeth over the entire circumference. The strap with negative teeth will mesh with teeth on the pulley thus giving positive displacement drive.

The pulley will carry around 10 kg so the pulley should be strong enough to carry it and cheap enough for halucent net price.

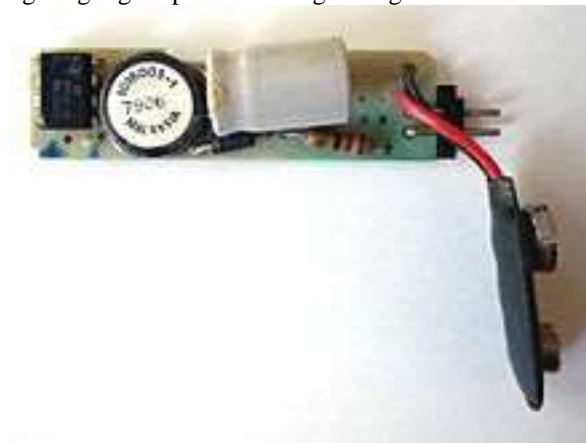
3.1.4 LED

- Voltage: 11.5-15 Volts DC
- Watts: 22
- Amps: 1.8
- Lumens Per Watt: 150
- Lumens: 3000
- Dimensions: 32(L)x16(W)x4(cm) 12.5(L)x6.25(W) x 1.75 (inches)
- Weight: 1.5kg 3.3lbs
- Beam Angle: 115 Degrees or 140 x 70 degrees

3.1.5 Boost Converter

Boost Converter is a device for DC-to-DC power converter that steps up voltage from its input supply to its output load. It is a class of switched-mode power supply (SMPS) containing at least 2 semiconductors with one diode and one transistor and at least one energy storage element, a capacitor, inductor, or the two in combination. To reduce voltage ripple, filters are made of capacitors are normally added to such a converter's output load-side filter and input supply-side filter.

Boost converter will be connected on the output terminals of DC dynamo. Boost Converter will amplify the current voltage produced by dynamo thus giving higher power for brighter lights.

**Fig. 3.2 Boost Converter****3.1.6 Weights**

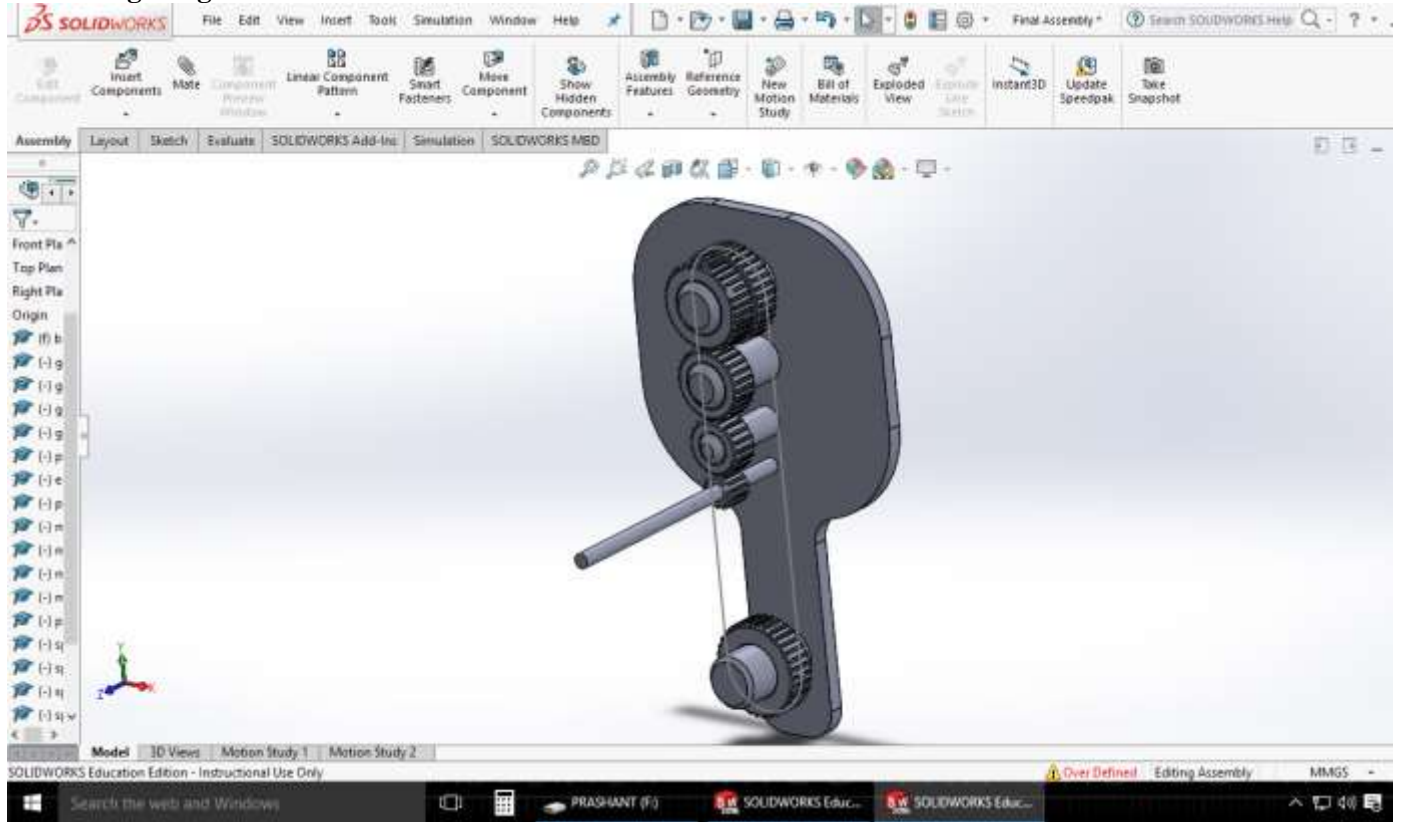
Weight bags will be used for generating the pulling force that will drive Halucent. Weight of around 10 kg will be suspended at the end of a chain strap which will pull the chain strap to give the driving motion to the gears.

3.1.7 Recoil Spring

The recoil spring will be used to recoil the motor when the eccentric jig will be near the respective dynamo. This consists of spiral spring with low to medium tension in it.

3.2 Design Of Experimental Setup

3.2.1 Design of gear train



Design and assembly of Halucent



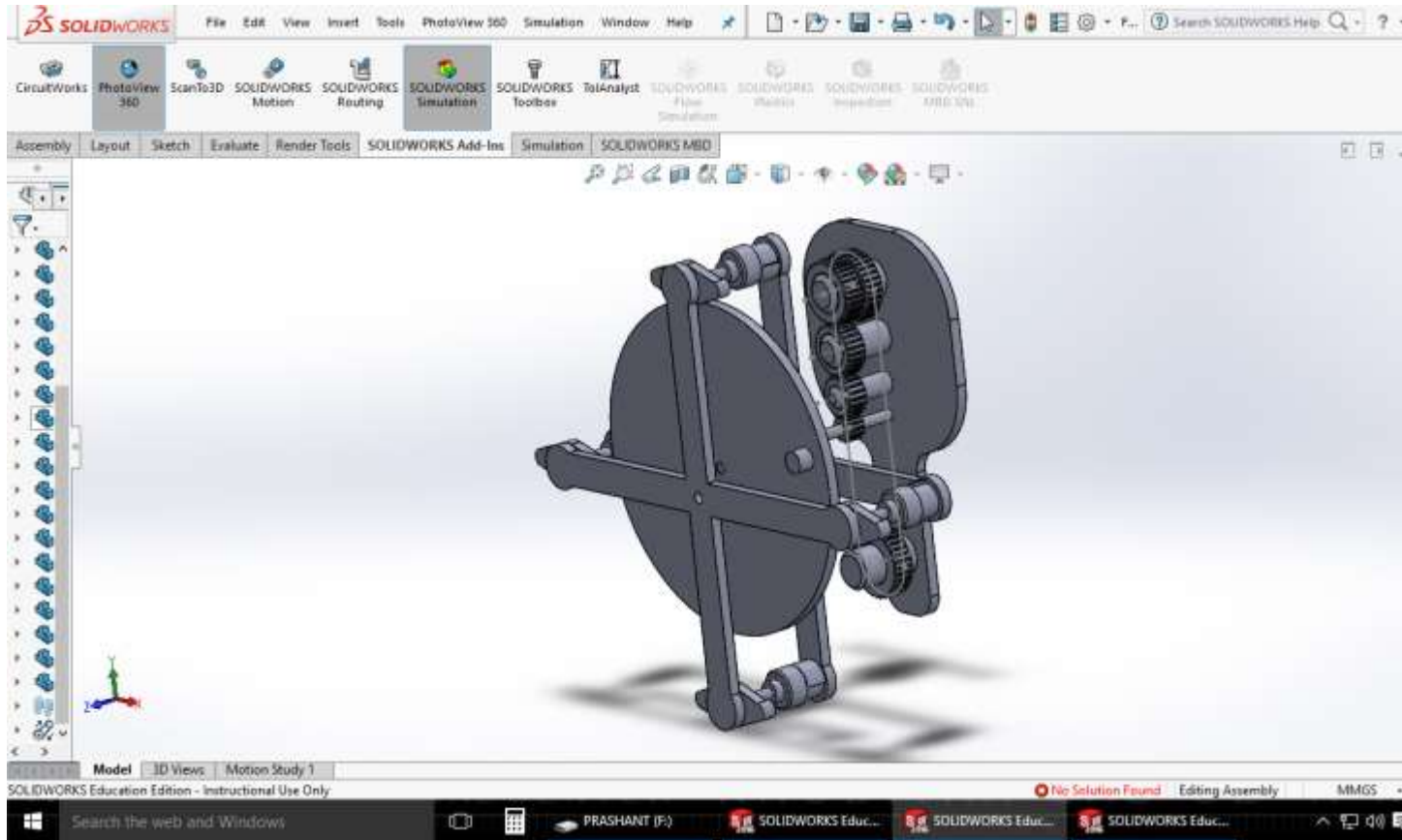


Figure- HALUCENT in SOLIDWORKS

3.3 COMPONENTS WITH THEIR DIMENSIONS AND MATERIAL SPECIFICATIONS

SR NO.	Name of component	Specifications	Material specification
1	Motor	1000RPM 12V DC motors with Gearbox	Cheap ,easily rotatable, high speed conversion
2	Gears	Reduction of 1:30	Light in weight, durable, Cheap plastic gears
3	LED	1105-15 v DC, max 3000 lumens	Bright low voltage led panel
4	Weight	10-15 kgs	Dumbbells, sand , water etc
5	Voltage Booster	Amplification of 1.5 times	

6	Recoil Spring	Spiral spring	Cheap, durable, good strength
7	Frame	D =500 mm., W=50 mm	Durable , light in weight
8	Center Disc	D=200 mm	for eccentricity
9	pulley	D=100 mm	Light , Durable

4. CONCLUSIONS

This device is highly beneficial for poor. Halucent is illuminator as well as life save. Halucent will light houses of millions of people who are light deprived at night. Halucent is eco friendly it does not produce any pollution while generating electricity and is not harmful for user unlike kerosene, wax, smokes etc. This device is made keeping the needy in main frame and these needy peoples can have access to this device for around only 800 Rs once it is developed, but it requires lot of work to be done before commercialization. The device is at its initial stage and at present it may cost more. The final Halucent will be cheap and will produce ample amount of light for more than 30 minutes. It will be able to even charge phones and power other usb devices for short period of time.

6. REFERENCES

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