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## MULTI PURPOSE GENEVA MACHINE

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**Index Terms** - Geneva Machine, Geneva Wheel, Geneva Punching, Geneva Cutting, Geneva Bending, Geneva Embossing machine.

### Abstract

The name of the project is MULTIPURPOSE GENEVA MECHANISM. The aim of the project of is can do different types of operation in one mechanism. The working principle of this model is based on Geneva mechanism. This project would be further beneficial in sustainable development for production industries; it is the main purpose of our project.

### I. INTRODUCTION

Geneva mechanism is commonly used in indexing mechanism where an **intermittent motion** is required.

The **inverse Geneva** mechanism which is variation of the Geneva mechanism is used where the wheel as to rotate in the same direction as crank .it required less radial space and the locking device can be a circular segment attached to the crank that locks by wiping against a built up rim on the periphery of the wheel.

The design and fabricating of a conventional Geneva mechanism is generally simple and inexpensive because there is no specially curved profile on any of the component except straight line and circular arcs.

### II. CONCEPT OF PROJECT

To make multipurpose operation machine by Geneva mechanism.

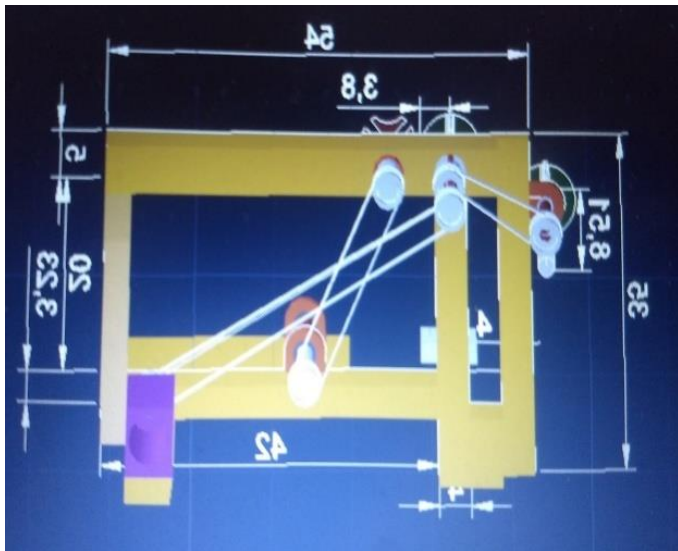
Geneva **mechanism**, also called Geneva stop, one of the most commonly. Used for producing intermittent rotary motion. Characterized by alternate period of motion and rest with no reversal in direction. In this mechanism we are using a Geneva wheel to operate all process

The Geneva drive or maltase cross is a gear mechanism that translates a continuous rotation movement into intermittent rotary motion. The rotating drive wheel is usually equipped with a pin that reaches into a slot located in the other wheel (driven wheel) that advances it by one step at a time.

### FIVE REASONS FOR SELECTING PROJECT

- We can do different types of operation in one mechanism
- This system is very easy and one can easily operate
- This mechanism is more effective as compared to other mechanism
- In this mechanism you can change a tool at any time

### III. Literature Review



From the article titled, Automatic Paper Cutting Machine Using Geneva Mechanism (Sunil H V, Ankit Yadav, Shivu L, Santosh Choudri) the design process involved was considered. In this project, a lever mechanism in combination with the geneva mechanism was used. This resulted in a reduction in mark up time and human fatigue. But the use of lever mechanism limited the operations that could be carried out. The fabrication of this tool was done using Mild Steel which contributed to its bulkiness. A machine that could carry out multiple operations, at different positions of the base frame has been described in the paper, Multi-Function Operating Machine (Mr. Pradip R. Bodade, Mr. Rangnath B. Tarmale, Mr. Aniket G. Nathe, Mr. Rajat R. Manalwar). This model involved the use of a Scotch Yoke mechanism, for carrying out the cutting operation through a hacksaw.

Review on Geneva Mechanism and its Applications (Ankur Prajapati, Chinmay Patel, Dhwanit Pankhania, Brijen Kanjia, Aakash Dubey) was also studied. In this article different journals have been reviewed with reference to the authors' project work. The project work carried out was the "Semi-Automatic bar Cutting Machine". By using Modification of the Geneva Paper Cutting Tool the Geneva Mechanism, the intermittent motion of the Geneva wheel was used as a feed mechanism for their machine. The study of various applications of Scotch Yoke mechanism such as in a syringe pump a hacksaw machine a dual shaper and a multi-purpose Scotch Yoke mechanism provided deeper insights into the application of the mechanism and guided for the use of the same. The lever mechanism was thus replaced with the Scotch Yoke mechanism as the cutting mechanism.

## PROBLEM STATEMENT

- When we start a project over first problem is the parts is not easily available in market.
- The main part Geneva wheel is not available in any shop.
- To make a Geneva mechanism is very difficult.
- Installation problem
- Punching print is not made proper

## IV. IMPLIMENTATION

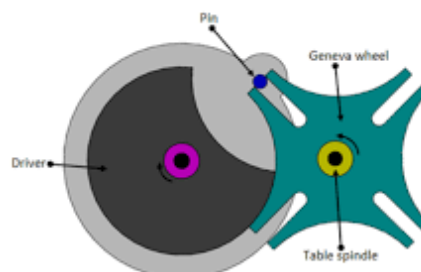
- Basic component of multipurpose Geneva mechanism is given below.



1) **Motor.** In any electric motor, function is based on simple electromagnetism. A current-carrying conductor generate a magnetic field; when it is placed in an outer magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the outer magnetic field.

As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is intended to harness the magnetic interaction among a current-carrying conductor and an external magnetic field to generate rotational motion.

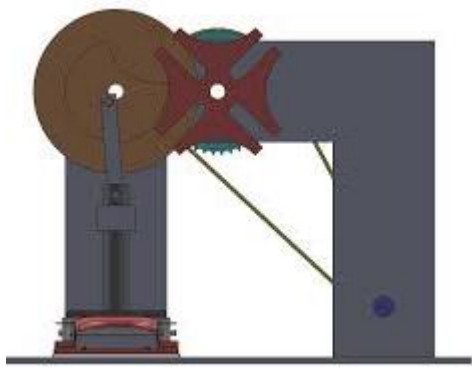
2) **Gear box:** Worm drive can reduce the **rotational speed** or transmit higher torque. The image shows the section of gear box with a worm gear driven by a worm. A 60 tooth worm gear reduces the speed by the **ratio of 60:1** It is a special case of spiral gears in which angle between the two axes is generally right angle. The smaller of the two gears is called worm which has large spiral angle



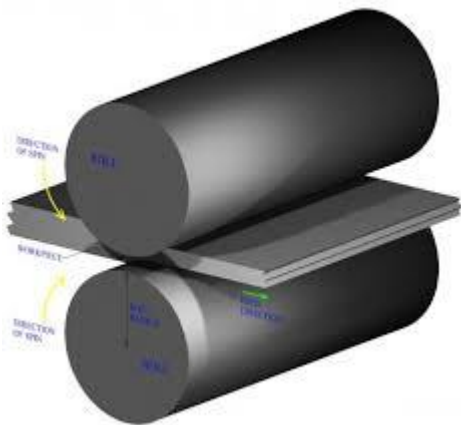
### Geneva Mechanism

- **3) Geneva mechanism:** Geneva mechanism is a simple and widely used timing mechanism that provides intermittent motion from a continuously rotating input. It consists of a rotating drive wheel (Driver) with a pin that reaches into as lot of the driven wheel (Geneva wheel) advancing it by one Step.

- Figure 4 Geneva mechanism in metal plates they are cheaper than cams, have good motion curve characteristics compared to ratchets and maintain good control of its load at all times. In addition, if properly sized to the load, the mechanism generally exhibits very long life
- A mechanism that transform a continuous rotation into an intermittent rotary motion, using an intermittent gear where the drive wheel has a pin that reach into a slot of the driven wheel and there by advances it by one step, and having a raised circular blocking disc that locks the driven wheel in position between steps.
- Geneva mechanism, is otherwise called as Geneva Stop, one of the most commonly used devices for producing intermittent rotary motion ,characterized by alternating periods of motion and rest with no reversal in direction. It is also used for index (i.e., rotating a shaft through a prescribed angle). The driver carries a pin that fits in the four radial holes in the Geneva. Between the slots there are four concave surfaces that fit the surface on the driver and serve up to keep the Geneva from rotating when they are fully engaged. In the position shown, the pin is toward the inside one of the slots, and, on further rotation of the driver, it will shift into the hole and rotate the follower through  $90^\circ$ . After the pin leaves the slot, the driver will rotate through  $270^\circ$  while the Geneva dwells—i.e., stands still. The lowest practical number of holes in a Geneva mechanism is 3; more than 18 are seldom used .If one of the hole positions is uncut, the number of turns that the driver can make is limited



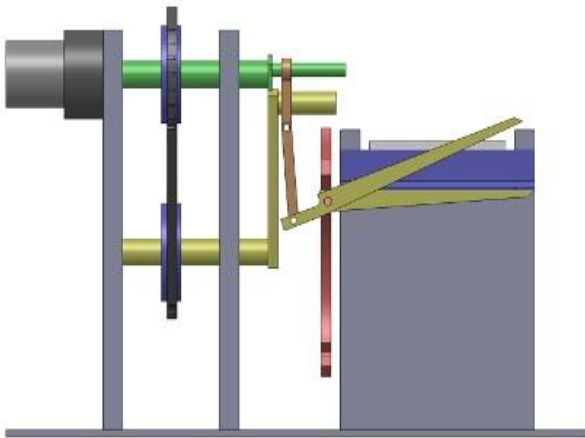
**4) Punching ram:** Punching is performed by moving the sheet metal between the top and bottom tools of a punch. The top tool (punch) mates with the bottom tool (die), cutting a simple shape (e.g. a square, circle, or hexagon) from the sheet by using punching ram and die.



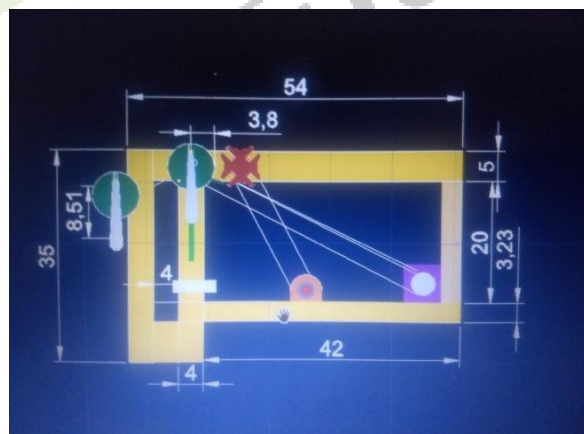
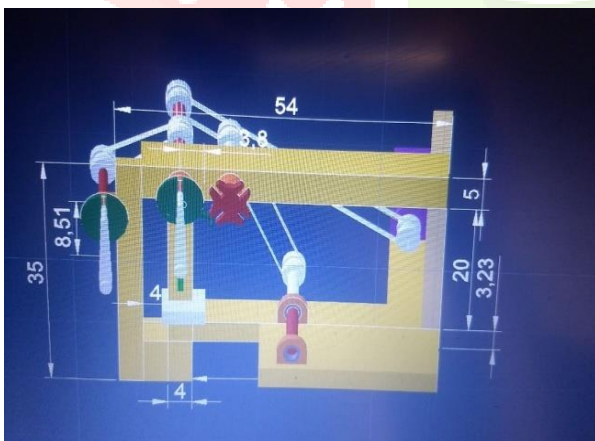
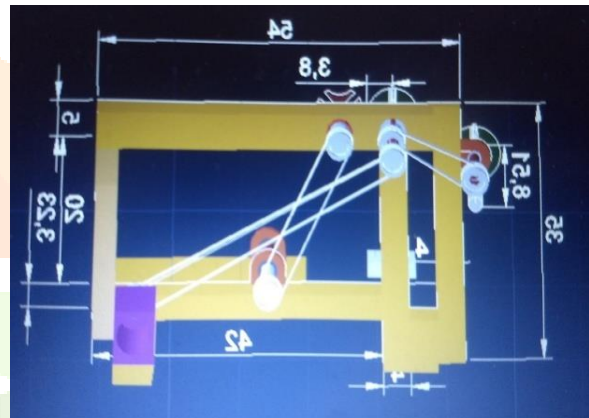
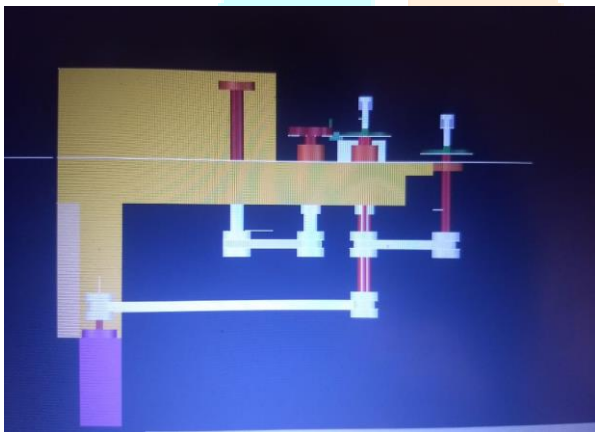
**5) Feeding rollers:** Rollers means a cylinder that rotates about a central axis and is used in various machines and device to move flatten or spread something. The two rollers used in Auto roll punching machine are driving and driven roller. Driving rollers are rollers or cylinders upon which something is rolled along.

**6) Cutting Mechanism:** there we propose the design and fabrication of a fully automated paper cutter based on Geneva mechanism. Our proposed system cuts paper pieces of equal lengths based on Geneva mechanism. System uses a 12V motor in order to drive the entire system. We use a shaft which is directly connected to the motor. This shaft has a connecting rod which is connected to a scissor in order to drive the cutting mechanism for cutting paper. This motor shaft is connected to a sprocket which is in turn

connected by a chain to another sprocket. This sprocket is now connected to a Geneva mechanism wheel. This wheel is used to drive paper feed into the cutter mechanism. Here we use Geneva mechanism driven by another connecting z shape rod. This mechanism ensures paper feed of equal length inserted at proper time intervals. System uses a supporting frame that maintains proper coordination between feed and cutting mechanism



## V. AUTOCAD DRAWING.



## VI. WORKING:

The main concept of Geneva mechanism is it can be used in multipurpose operations (E.g.:-cutting , bending, punching)

In this mechanism we use motor to operate a Geneva mechanism.

The motor rotates driven wheel and the driven wheel rotates Geneva wheel.

The gear is connected to the Geneva wheel so when the Geneva wheel is rotated gear is also rotated.

The gear is connected to other gear with the help of chain to supply rotary motion.

The roller is connecting with a gear. In this process there are two rollers are used for a bending process.

We also do rolling process with the help of rollers, In this mechanism.

In other process we used connecting rod to do cutting process the one end of the rod are attached with driven wheel and other end attached with seizer for a cutting process.

In other process one side of a connecting rod are connected to driven wheel and other side is free.

In Free side as a attachment of tool, than we have attach a different Tools Like:- Punching Tool, V Bending Tool, Coining tool, Embossing Tool and forming Tool.

We can also changes a work table for coining operation, V Bending operation and Embossing operation.

Punching is a metal fabricating process that removes a scrap slug from the metal workpiece each time a punch enters the punching die. This process leaves a hole in the metal workpiece.

In v-bending, a wedge shaped punch forces the metal sheet or strip into a wedge shaped die cavity.

Coinage is the process of manufacturing coins using a kind of stamping which is now generically known in metalworking as "coining"

Embossing is a stamping process for producing raised or sunken designs or relief in sheet metal. This process can be made by means of matched male and female roller dies, or by passing sheet or a strip of metal between rolls of the desired pattern.

Forming processes differ from subtractive processes considering that no material is removed.

In punching process we used spring for punching.

When connecting rod comes downward then spring is pressed and work piece has been punched when rod moves upward then spring is release then work piece is ready.

## VII. RESULTS AND DISCUSSION

The project carried out by us is used to make punching on paper and metal and G.I, sheet with more prescribed than a conventional punching machine. As conventional punching machine takes more time for job setting, marking, punching operation, Labor cost is also more. With this Geneva wheel based auto roll punching machine the time taken for all this process can be reduced and production time also reduced and production rate will be high. No extra skill is required for operating this system .Operation is very smooth and in this system we can get more output by applying less effort it is very much useful for making series of holes of same diameter and constant pitch. Thus it can be useful for punching application.

## VIII. CONCLUSION

Geneva drive indexing mechanism converts the continuous motion of the driver wheel into intermittent rotary motion of the gear .cam with pin arrangement integrated with Geneva drive .input shaft having driver wheel at one end and cam drive at the other end Geneva drive and gear are mounted on the output shaft . by cam with Geneva drive arrangement the continuous motion of the driver wheel convert into intermittent motion of gear and chain arrangement. Due to gear rotation the conveyor belt moves and thus mechanism proves its significance. In this mechanism we will doing multiple operation Like:- cutting, bending, punching, rolling, embossing, coining, forming etc.

## FUTURE SCOPE

- Manufacturing industries.
- Small industries because its simplest and less expensive.
- We can do multiple operation in one machine
- Multiple operation perform in single stroke

## ACKNOWLEDGMENT

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