PROJECT ABSTRACT

Geneva Mechanism Demo Rig with Geared Motor Drive

A working Geneva mechanism rig: a four-slot acrylic star wheel driven by a pinned drive wheel on a geared DC motor, converting continuous rotation into indexed intermittent motion. Delivered built-to-order with the rig, timing procedure, report, PPT and viva kit.

01. Title

Geneva Mechanism Demo Rig with Geared Motor Drive

02. Introduction / Background

Automation often needs start-stop motion: an indexing table pausing at each station, a film projector holding each frame. The Geneva mechanism is the classic answer — a drive wheel with a pin turns continuously, and each revolution kicks a slotted star wheel forward by exactly one step with a clean dwell between. It is pure geometry doing the work of a servo, and it sits in every theory-of-machines syllabus. This rig makes it physical: a four-slot acrylic star wheel, a drive wheel with pin and locking arc, a geared motor with speed control, on a plywood base.

03. Problem Statement

The pin-and-slot engagement and the locking-arc dwell are hard to grasp from a textbook diagram. Students rarely time the motion-vs-dwell phases or connect the geometry to indexing machines. This project provides a working rig where the engagement is watched, timed and measured.

04. Objectives

- Fabricate a 4-slot Geneva star wheel and a drive wheel with pin and locking arc.
- Drive it with a geared DC motor and adjustable speed controller.
- Keep the engagement visible through the acrylic star wheel and open layout.
- Deliver a motion-vs-dwell timing measurement procedure.
- Relate the geometry to indexing applications in the report.
- Deliver fabrication drawings, report, PPT and viva Q&A.

05. Proposed Methodology

The star wheel and drive wheel are fabricated and mounted on shafts with bearings; the geared motor is coupled to the drive wheel; the speed controller is wired. The

student verifies free rotation, then times multiple cycles with a stopwatch at several speeds and compares the motion-dwell ratio with the geometric expectation.

06. System Architecture / Working

The motor turns the drive wheel continuously. Its pin slides into a star-wheel slot and pushes it through exactly one quarter-turn per drive revolution; the pin then exits and the locking arc holds the star wheel fixed — the dwell. Each drive revolution yields one indexed step plus dwell. Changing the speed controller alters the indexing rate without changing the motion-dwell geometry.

07. Hardware / Software Requirements

- 4-slot Geneva star wheel (acrylic)
- Drive wheel with steel pin and locking arc
- Geared DC motor with speed controller
- Plywood base with standoffs and bearings
- Steel shafts and fasteners
- Stopwatch
- 12 V DC power supply

08. Expected Outcomes

- A working Geneva drive with true indexed motion and dwell.
- Student-measured motion-dwell timing matching the geometric ratio.
- A documented connection to real indexing applications.
- A complete report, PPT and viva Q&A on intermittent-motion mechanisms.

09. Applications

- Theory-of-machines teaching laboratories.
- Demonstrating indexing for assembly-machine concepts.
- Kinematics measurement exercises.

10. Future Scope

- Interchangeable 3/5/6-slot star wheels for ratio comparison.
- Optical indexing counter for automated timing.
- Servo-driven variant for programmable indexing.
- Load-torque study on the output shaft.