Instruction Manual

for

Balancing of Reciprocating Masses Apparatus

Introduction

The apparatus is designed to demonstrate the effect of unbalanced mass in reciprocating motion.

Specifications

1. Cylinder, piston and connecting rod arrangement which is driven by pulley

2. 1 H.P. D.C. shunt motor, 3000 RPM, 230 V

3. Control panel with dimmerstat (DC) for speed variation and ammeter

Theory

In any machine the moving or reciprocating parts should be completely balanced. If the moving parts are unbalanced, the inertia forces are set up that tend to produce vibrations etc. Such vibrations, particularly if they occur at high speeds may produce friction, excessive noise and wear & tear of machine parts.

The apparatus consists of a simple cylinder, piston and connecting rod arrangement. The piston, driven by the motor, reciprocates in the cylinder. The motor is coupled with connecting rod. Speed of the motor can be varied with the help of dimmerstat. Initially the total system is in completely balanced condition. That is, the piston is reciprocating smoothly in the cylinder without extracting any extra current from the motor. This can be visualized on the ammeter. If the system is made unbalanced by putting some extra weight on the piston, immediately it will start to extract extra current from the motor. This change in current can be observed on the ammeter. The speed of the connecting rod can be measured by using RPM indicator.

Experiment

1. Set the dimmerstat at zero position. Switch on the power supply.

2. Rotate the dimmerstat and increase the speed of motor. Keep the speed of motor constant at desired value.

3. Note down the speed of motor on RPM indicator and current variation on ammeter.

4. Switch off the power supply. Add extra weight on the piston. Switch on the power supply again.

5. Set the speed of the motor as previously kept. Note down the speed of motor on RPM indicator and current variation on ammeter.

Observation Table

S. No.	Extra weight kept (Kgf)	Motor current variation (A)

Remarks