CENTRAL SCIENTIFIC COMPANY

OPERATING INSTRUCTIONS

Trajectory Apparatus
No.72717-28

1. Introduction

The Trajectory Apparatus uses a direct approach to graphing the parabolic curve of a projectile. The path of a launched ball is marked against a target plate, and transferred to graphing paper. The apparatus is simple to use, durable, and cost-efficient.

2. Description

A backboard is set upright on two base "feet". The backboard has slots for attaching an aluminum target plate so that the plate may be moved to different positions to "catch" a launched steel ball. The apparatus includes pressure-sensitive paper to attach to the target plate so that successive launchings of the ball may be recorded. A track launcher with ball-stop is provided to attach to the backboard, along with the trajectory ball. Hardware (three wing nuts, two-knurled head thumbscrews, and one machine screw) is included.

Fig. 1

3. Setup

Unpack and lay out all the components of the kit. See Figure 1 for the correct positioning of the components. Position the plotting board as shown. Press the plotting board into the slots of the wooden supports and fasten it with the slotted screws.

Use the two knurled-head thumbscrews and the two wing nuts to attach the target plate to the plotting board. Use the machine screw and the remaining wing nut to attach the launcher near the upper right hand corner of the plotting board.

Hold a small carpenter's level or circular level (No. 32198) on the top edge of the plotting board. If necessary, move the apparatus to a level position on the table, or shim up the wooden base support, using layers of folded paper.

Adjust the angle of the launcher until the steel ball will balance near the end of the launcher without tending to roll off or roll back toward the curved section. Firmly tighten the wing nut that holds the launcher in place.

Tape the four corners of a piece of graph paper to the plotting board so that:

- The top margin of the paper is flush with the lower edge of the target plate slot.
- The right-hand margin of the paper just touches the end of the launcher.
- The paper is taped tightly and smoothly to the board. (A piece of carbon paper may be sandwiched between two pieces of graph paper to obtain a carbon copy of the data you will be plotting in this experiment.)

Move the target plate slightly to the right until its face is vertically aligned top and bottom with the second darker line in from the left hand edge of the graph paper.

3. Operation

Release the ball from different heights on the launcher until you find the point from which the ball will strike the target plate at about 2cm to 5cm from its lower end. Slide the aluminum ball-stop down the launcher track to this point on the launcher. The ball is always to be launched from this same point throughout the course of plotting a trajectory path.

Tightly cover the surface of the target plate with a strip of the 1" x 11" pressure-sensitive recording paper. Tape each end of the paper to the inside of the target plate. The pressure sensitive paper is used to mark the course of the ball's path. Follow this procedure:

- Move the target plate to the right so that its impact surface is within 2cm or 3cm of the launcher and is vertically aligned top and bottom with the nearest dark centimeter line. Tighten the wing nuts securely and do so each time before launching the ball. Don't forget to check to see that the apparatus is level before launching the ball.
- Launch the ball. Transferring the resulting mark from the pressure-sensitive paper takes but a moment by following these steps:
- Hold a filing card flat against the impact board at the highest point of the recorded mark, with the end of the card held squarely against the graph paper.
- Look at the mark at your eye level.
- Angle your pencil somewhat so that you can make a small dot where the end of the filing card and the graph paper come together.
- For your next mark, move the target plate 2cm farther to the left, and repeat in increments of 2cm for each mark until you have enough marks to join for a smooth curve on your graph paper.

4. Maintenance

The Trajectory Apparatus requires no special maintenance. If you should experience any difficulty with a Trajectory Apparatus, please contact Central Scientific Company, giving details of the problem. To ensure better service, please do not return any merchandise to Central Scientific Company without authorization.

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