5 Development on experimental equipment for showing the differential pressure on spinning table tennis balls

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1 Introduction

In order to let students understand the differential pressure produced during table tennis spinning and flying, and the changing rules of affecting flexure of the flight path of the ball, teachers used to adopt the traditional method to show the differential pressure on table tennis balls, in which two ropes hung two table – tennis balls about 2 ~ 3 mm away were controlled by hands and gas – flow to the center space between the two balls was puffed up by mouth. The method had some disadvantages: varying puff direction, rate and intensity; keeping short time of mutual attraction between the two spinning balls, etc. These made the balls swing or come into collision and produce direct negative influence on the experimental result. To resolve the problems above, this paper has developed novel experimental equipment for showing the differential pressure on table tennis balls. It was by a small blower that the equipment could keep the blowing rate and intensity constant, concentrate the gas – flow steadily, keep long time of mutual attraction between the two spinning balls, and show remarkable difference in the extent of mutual attraction between the two balls under different blowing rate and intensity, and then the disadvantages of the traditional experiment have entirely been overcome. Basic structure of the equipment has been introduced in this paper.

2 Structure and development of the equipment

(1) Base plate: Al steel, 330 × 140 × 20 mm. There was a 100 × 5 mm flute on it.

(2) Reference frame: Al steel, 140 mm long, 105 mm high. There is a scale on its top. It connects with the flute on the base plate through a 90 mm high support, so it can move fore and after.

(3) Hung balls: standard table tennis balls, 40 mm diameter, 2. 70 g weight. They were hung on the reference frame with 0. 33 mm diameter copper lines respectively which were knotted at one of the end.

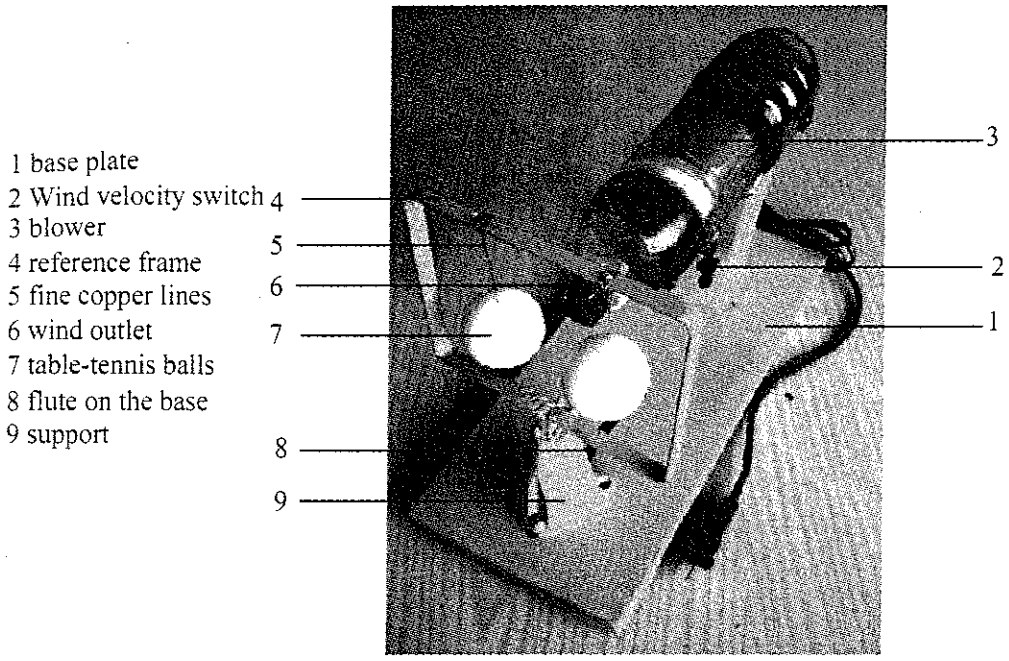

Figure 1. Structure of the experimental equipment

(4) Blower: RCY -850, rated power 850 W, rated voltage 220 V, rated frequency 50 Hz, wind velocity 4 ~ 10 m/s. Switch for adjusting wind velocity is on the bracket of the blower. Size and position of the wind outlet can be adjusted for the need of differential pressure experiment.

3 Experimental examples

Table 1. Data of some experimental examples

	Size of wind outlet(mm)	Wind velocity (m/s)	Distance from outlet to frame (mm)	Distance from outlet center to base plate (mm)	Distance between the two lines(mm)	Distance between the two balls(mm)
Weak wind	15 × 10	6	30	130	60	20
Strong wind	15 × 10	8	30	130	60	20

4 Conclusions

It was conformed that experiment with the equipment is concise and scientific and had remarkable experimental phenomenon. This kind of equipment is benefit for students to directly understand the differential pressure produced during table tennis rotating and flying, and the changing rules of affecting the flexure of the flying curve of balls.